H23

# Progress In Development of the Budgeting Method of Planning in Agricultural Economics

## Illustrated With a Farm Organization Study in the Purchase Region of Kentucky

*By*

JOHN B. HUTSON,
Senior Agricultural Economist,
Bureau of Agricultural Economics,
United States Department of Agriculture

LC

Columbia

WASHINGTON, D. C.
1930

3781
C72H
ED
Dissertation

STANFORD UNIVERSITY LIBRARIES
WITHDRAWN

# Progress In Development of the Budgeting Method of Planning in Agricultural Economics

## Illustrated With a Farm Organization Study in the Purchase Region of Kentucky

*By*

JOHN B. HUTSON,
Senior Agricultural Economist,
Bureau of Agricultural Economics,
United States Department of Agriculture

Submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Faculty of Political Science Columbia University

WASHINGTON, D. C.
1930

## PREFACE

It is now more than a century and a half since economics had its beginning as a science. During this long period we have progressed from the static concept of the early classical economists to the slowly moving equilibrium concept of Alfred Marshall and on to the more dynamic concept of the present time. This progress has not been made without following many leads some of which have proven false. But if anyone doubts that progress has been made let him contrast the analysis of Ricardo in which, once you accept his assumptions, his conclusions are inevitable, with the supply-price and demand-price analysis of Marshall or with the methods of the business-cycle or the price analyst of to-day. Most present day economists use qualitative methods as did Ricardo but many of them supplement qualitative analysis with quantitative analysis and are continually modifying their conclusions in the light of changing conditions and institutions and as more thorough studies give a better comprehension of relationships.

Likewise in the more recent application of economics in the field of agriculture changes in methods are to be noted. This study is concerned with one of the newer developments in this field. More specifically it is an attempt to apply a forward-looking dynamic concept, for which we are indebted to Dr. Henry C. Taylor more largely than any other, to farm organization problems. The development of the method described and illustrated here is not the work of any one individual but rather the result of the contributions of a large number of workers in this field. In its present form this method is imperfect and has many limitations. It may eventually prove to be a false lead. Yet to some it appears promising at the present time and it is hoped that this brief outline will aid in its evaluation and perhaps contribute something to its further development.

## ACKNOWLEDGMENTS

The writer wishes gratefully to acknowledge the services of a number of men for help of different kinds in connection with this study. He wishes to thank Professors E. R. A. Seligman and O. S. Morgan and Mr. R. W. Souter of Columbia University for suggestions concerning the form and content of the first four chapters of the study. He is indebted to those in the Bureau of Agricultural Economics and the State colleges of agriculture, particularly those doing research in prices and farm practices, whose studies have been drawn upon freely in making this study. A study such as is attempted here is not possible except as it is a part of a larger forward looking program. He wishes to express his very great appreciation to Director Thomas Cooper of the Kentucky Agricultural Experiment Station and Messrs. M. L. Wilson and H. R. Tolley, formerly of the Bureau of Agricultural Economics, whose administrative support made this study possible and whose advice and counsel were helpful at all times. It was Mr. Wilson who suggested the use of the term *budgeting* in this connection. He wishes to thank Messrs. W. G. Finn and Z. L. Galloway of the Kentucky Agricultural Experiment Station for their very large contributions to this study. They did a considerable part of the planning and practically all the routine in connection with the illustration used. Mr. Galloway collected the major portion of the field data and Mr. Finn supervised the analyses of the data and both assisted in preparing the part beginning with Chapter V for publication. This part has been published as Kentucky Experiment Station Bulletin 292 under joint authorship and is here used with the permission of the Kentucky Experiment Station.

## CONTENTS


### CHAPTER I

INTRODUCTION

Two points of view of research workers in farm organization,—one group would show past relationships and offer explanations and another would, in addition, interpret in terms of existing conditions and prospective developments. Justification for second point of view three-fold: (1) Task of interpretation difficult, (2) results of research inevitably influenced by judgment of research worker, and (3) farmer poorly equipped for task of interpretation.

### CHAPTER II

THE NATURE OF THE FARMER'S PROBLEM

Farmer's problem characterized: (1) Farming unit small, (2) farmer's resources comparatively inelastic and turnover slow, (3) output of farm variable and only partially controllable, (4) seasonal requirements and tendency of farm enterprises to compete with, supplement or complement other enterprises make diversity advisable, (5) farmer's price problem complicated, (6) farmer can seldom give his entire time to managerial duties, and (7) farmer to some extent isolated.

### CHAPTER III

THE DEVELOPMENT OF RESEARCH IN FARM ORGANIZATION

Early studies in farm organization concerned chiefly with internal relationships as revealed by study of farms as actually operated,—conditions during this period relatively stable. Two methods of obtaining data developed,—accounting method and survey method. In more recent years conditions relatively unstable and more attention given to factors external to farm,—greater utilization of secondary data. Case, informal statistical, and statistical methods used in farm organization studies but each better adapted to stable than changing conditions,—budgeting method developed to aid in making interpretations in light of changing conditions.

## CHAPTER IV

### The Essentials of the Budgeting Method

Budgeting method similar to method of operator's estimate,—an advance estimate method adapted to problems of research workers in farm organization. Three steps: (1) Determining most common sets of resources and systems of farming in area studied, (2) estimating production and price relationships, and (3) outlining different systems of farming for most common sets of resources, working out complete budget statements for each and evaluating systems on basis of returns indicated by budget statements. Limitations due to fact that average rather than marginal relationships used and modal technical efficiency assumed; also advance estimates may be considered certainties rather than probabilities.

## CHAPTER V

### The Study of Systems of Farming in the Purchase Region of Kentucky, Illustrating the Budgeting Method

Agriculture in region studied going through transition stage. Data obtained showing total farm returns, requirements for producing crops and livestock for short period; also data showing yields of crops, production of livestock, and prices of cost factors and products sold for longer period. Basis for conclusions,—expected returns based on normal crop and livestock requirements and livestock production and assumed prices—characteristics of profitable systems of farming in section. Actual and suggested systems shown for farms of 60, 80, 100, 150, 200 and 300 acres,—weaknesses of actual systems pointed out and conditions, to which each suggested system is applicable, described. Farms of different sizes compared—a method outlined to be used by farmers in planning a farming system—farming compared with other undertakings.

### Appendix

Detailed budget statement shown for each system of farming outlined in preceding section.

# CHAPTER I

## INTRODUCTION

The farmer's problem has been described as being fourfold, involving what and how much to produce, what and how much equipment to employ, what methods and practices to use, and how to dispose of the product most economically. In this study attention will be given to only one part of this problem,—the part that relates to the lines of production to follow and the quantity of each enterprise to include in a system of farming. This part is generally called farm organization.

Research work in farm organization, as well as in some other phases of economic research in agriculture, is undertaken primarily for the purpose of helping farmers with this problem. There is a general agreement among research workers in farm organization that past relationships should be studied and that, if the research is to be of most value, the conclusions reached after a study of past experience must somehow be taken into account by the farmer in planning future activities. Practically all workers also agree that either the research worker or the farmer, or both, should be informed as to present conditions and prospective developments.

There are, however, at least two points of view as to just how far it is advisable for research workers to go in interpreting results and in presenting conclusions. One group holds that research workers should indicate the relationships that existed during some past period, describe conditions that prevailed during that period and offer explanations as to why those relationships existed. Those who hold this point of view may be divided into two groups on the basis of the procedure followed. Some would study the organization of farms over a short period, usually from one to three years, and the results obtained and describe the conditions that prevailed. They would indicate which were the most profitable and which the least profitable farming systems during the short period under consideration. Others would use an historical approach. They would show the developments over a long period, usually 20 years or longer, such as changes in the acreage of the

different crops, the numbers of the various kinds of livestock, crop yields, and the prices of the products sold, and offer explanations as to why these changes have taken place. Some who hold this point of view would combine the two procedures. Most of them would present current information relating to existing conditions and prospective developments. They would not, however, go beyond the showing and explanation of past relationships in interpreting results and in presenting conclusions. This point of view is similar to that held by many research workers and entrepreneurs in other industries.

Other research workers would go a step further and attempt to interpret the results of research in the light of existing conditions and prospective developments. In addition to the conditions that prevailed during the periods covered by their studies, they would take into account, in their analysis, also existing conditions and prospective developments and present their conclusions in the light of this dynamic situation. In other words, they would not only show past relationships but also would indicate the relationships that are to be expected under present conditions and if prospective developments take place.[1]

The justification of this latter point of view is threefold. In the first place the task of interpretation is a difficult one. Farm organization studies have to do both with relationships inside and with relationships outside the farm. Both kinds of relationships are continually changing. Some of these changes may be more permanent than others. Some may be seasonal, others cyclical, others secular, and others irregular. Consequently the relationships that prevailed over a long period should be considered. If studies are confined to one or two years or even a short period of years the series may show an exceptional rather than the more

---

[1] See J. M. Clark, "The Economics of Overhead Costs," 1923; J. D. Black, Method of Substitution, "Production Economics," Chapter IX, 1926; C. L. Holmes, Nature of Farming Costs, "Economics of Farm Organization and Management," Chapter XVI, 1928; George A. Pond and Jesse W. Tapp, United States Department of Agriculture Bulletin 1271, "A Study of Farm Organization in Southwestern Minnesota," 1924, and United States Department of Agriculture Farmers' Bulletin 1564, "Farm Budgeting," 1928. To the writer these discussions represent the transition stage between these two points of view. Professor Clark particularly in his discussion of Three Methods of Allocating Costs, Chapter XI, points the way to a forward-looking approach generally applicable to all industries. Professors Black and Holmes point out the inadequacy of the backward looking cost allocating approach to the farmer's problem and the latter two publications outline more definitely a forward-looking approach which is to be used by the farmer, however, rather than by the research worker.

usual relationship. For example, during one year, or even a short period, corn or hogs or some specialty may be decidedly the most profitable enterprise in a given area because of unusually favorable prices or conditions for production and yet over a long period may prove to be one of the least profitable enterprises. However, it will seldom be possible to obtain long-period data relating to some important phases of the problem. Hence it will often be necessary to depend upon short-period data and the consequent necessity for the combined use of long-period and short-period data adds to the difficulties of interpretation particularly on the part of the layman.

In the second place the results of research are inevitably influenced to some extent by the judgment of the research worker. He selects the series that are used and those that are to be presented and decides upon the many necessary adjustments. In making these selections and adjustments he is often influenced by present conditions and prospective developments. In view of this, in many cases a conscious and definite attempt to interpret in the light of existing conditions and prospective developments would result in a more accurate statement as to the relationships that actually prevailed during the periods under consideration and reveal more clearly the bases upon which the interpretation rests.

Finally, the farmer is not well equipped for the task of interpretation. While entrepreneurs in other industries are confronted with difficulties of the same general nature as the above, the business units in many cases are large enough to permit specialization. The manager himself may then be a specialist in planning or may employ such a specialist. In either case he is often in close touch with the research activities relating to his particular problems. In contrast, the farmer usually gives only part of his time to planning. He is also a foreman or a laborer. He is not in close touch with the research relating to his problems. The results of research come to him when a job is completed, usually in bulk. He can seldom employ assistants to help him interpret these results in the light of recent and prospective developments. Consequently there has developed the point of view that the research worker in farm organization must interpret his results in the light of present conditions and prospective develop-

ments if they are to be most useful. The budgeting method described and illustrated in this manuscript is suggested as a definite and logical way of aiding in making this interpretation.

In using the budgeting method the research worker in farm organization studies past relationships, some of which may be revealed by his own special studies, and some of which may be revealed by the studies of others particularly in the field of prices and farm practices; some of each group may be revealed by long-period and some by short-period data; in addition he considers conditions that prevailed during each of these periods, existing conditions, prospective developments, and makes estimates as to relationships that appear probable during the period of years just ahead. More specifically he uses such research results as are available, outlines systems of farming for the most common sets of resources in a local area, and prepares complete budget statements for each system outlined. In preparing these outlines he considers a local area a unit of study and makes long-time forecasts or estimates as to cost factors, production, and prices for the different farm commodities that are being produced in this area and in other areas under similar conditions. These outlines, including the budget statements, represent, in summary form, his conclusions as to the possibilities, during the period of years just ahead, of the various systems of farming that are being or that may be followed in the section. He also in most cases shows the actual relationships upon which his conclusions are based.

While systems are outlined for the more common sets of resources in a local section no attempt is made to outline systems for all the different sets of resources. Consequently it is not intended that the presentation of the outlines shall relieve the farmer of the responsibility of deciding upon the particular system of farming that is best adapted to his particular conditions. It is believed that the farmer, knowing his own resources, his own aptitudes, and preferences, can get at the research worker's conclusions more readily when they are presented in the form of outlines and budget statements for resources similar to his own and can more easily use these conclusions in planning a production program adapted to his resources. In addition he may profit by having before him the method used by the research worker in the interpreting process. It is also believed by those who hold this point of view that studies

of this kind, when made in two or more local areas, will provide farmers with a better basis for determining the possibilities of a particular system in each of these areas and of different systems in different areas than they would have without such studies or than they would have if the relationships that actually prevailed during a given period or during different periods were presented. Moreover, the results of such studies may be useful to farmers in comparing the opportunities in farming with opportunities in other industries.

The use of the budgeting method is more likely to be advisable during those periods and in those areas in which conditions are undergoing the most marked changes. Conversely, the procedure suggested by the other point of view is less likely to result in faulty conclusions during periods and in areas in which conditions are relatively stable. During the early years of farm organization research, from 1900 to 1915, the methods used were better adapted to conditions that prevailed during that period than to conditions that have prevailed during the past few years. Conditions during the early period were relatively stable. The budgeting method of research has been developed during the past few years when conditions have been relatively unstable. This method has had its most extensive use in those areas in which the year-to-year changes are most marked or in which the most marked adjustments in farming systems have taken place.

In the remaining sections of this manuscript the following procedure is observed. First, the nature of the farmer's problem is described; second, the development of research in farm organization is briefly reviewed; third, the budgeting method is described in detail; and finally, the budgeting method is illustrated as it has been applied in a farm organization study in the Purchase Region of Kentucky. As the concluding part of this illustration a procedure that may be used by farmers in planning a production program is outlined.

## CHAPTER II

## THE NATURE OF THE FARMER'S PROBLEM

In considering in detail methods that may be expected to yield results in helping the farmer to decide upon a production program, certain characteristics of the farmers problem should be kept in mind.[2] First, the farming unit is small. In size the farm is similar to the retail establishment. While there are a few large farms and a few chain farming units in the United States, approximately two-thirds of the farms are within the range in area from 20 to 175 acres. The average value of all farm property in 1925 was less than $9,000 per farm. The regular labor force is generally composed of the members of one family. There are more than six million of these more or less independently operated family farm units in the United States.[3]

Second, the farmer's resources are comparatively inelastic and the turnover is slow. At any given time the farmer's resources are fairly definitely limited. It may be possible to rent an additional field on an adjoining farm but time lost going to and from the field may absorb any profits that might otherwise accrue from its use. It may be possible to hire additional labor and cultivate more intensively or to handle more livestock. But more intensive cultivation may mean more equipment and storage space and more livestock will mean more barn space and perhaps increased hazards from disease and the added returns may not be such as to justify the added expenditures and hazards. Buildings and other equipment usually last several years and they can seldom be used as effectively for other enterprises as for those for which they were originally constructed.

Comparing yearly sales with operating capital such as the total invested in livestock, machinery, feed, and used for operating

---

[2] See E. R. A. Seligman, "Economics of Farm Relief," Chapter II, for complete discussion of this subject.

[3] In cases in which an individual or corporation owns more than one farm, these farms may not be independently operated. According to the 1925 Agricultural Census there were 6,371,640 farms in the United States of which approximately 61 per cent were operated by owners and 39 per cent by tenants. A considerable part of the latter group are not operated entirely independently.

expenses, it is found that the yearly sales are smaller than the operating capital more often than they are larger. The total capital invested, including that in land and buildings, is usually from three to five times the amount received from yearly sales.

A period of six months to one year elapses between the time crops are planted and the time they are marketed. From one to five years usually elapse from the time livestock are bred until the young or their products are sold. All of this suggests that the farmer must make general plans some years in advance of their execution and that, for the most part, he must plan to use certain fairly definitely fixed resources during a comparatively long period.

Third, the seasonal requirements and tendency of farm enterprises to compete with, supplement, or complement other enterprises are such as to make diversity advisable in most cases. Two enterprises compete if they use land, man labor, or horse work at the same time, or feeds of the same kind. One enterprise is supplementary to another when it uses man labor or horse work at different times or feeds of different kinds or feeds of the same kind in varying degrees. The relationship is complementary when one enterprise contributes to the production of another.

Practically any crop or class of livestock supplements in some ways and complements in other ways several other enterprises. In any section most classes of livestock are supplementary to most crops since the largest crop requirements are during the growing season and the largest livestock requirements come during the winter months. A dairy cow contributes to crops in that manure is produced which may be used to increase crop yields. Legumes and pastures contribute to other crops and livestock in that they help balance the ration for the livestock and aid in the improvement of crop yields. Because of these relationships between farm enterprises most farming systems usually include several enterprises.

Fourth, the output of the farm is variable and only partially controllable. The output of a given farm per unit of input varies from year to year. A particular field may yield 60 bushels of corn one year and only 40 bushels the following year, even when similar methods of cultivation are followed. A larger output of livestock products will be obtained from a similar quantity of feed

during some years than during other years. These variations are largely due to changes in weather conditions, insects, and animal and plant diseases, some of which can not be foreseen and are controllable either not at all or only to a limited extent. Since the uncontrollable elements are less predominant in other industries the output is subject to more complete control.

The output of the farm is also influenced by secular changes. Developments in the use of equipment, such as the introduction of the wheat binder, the corn binder, the tractor, the small combine, and the cotton picker may influence production. The gradual depletion of the soil affects the yields of crops and some crops respond better to fertilizer treatments than others. Increased production due to improved varieties of crops and cultural practices and improved breeding of livestock and feeding practices is continually taking place.

Fifth, the farmer's price problem is a complicated one. The prices of many farm products fluctuate widely from year to year, due partly to the influence of the uncontrollable elements on production but also partly to voluntary changes in production and partly to changes in consumer demand. The prices of many farm products tend to move in cycles due largely to adjustments in production plans that farmers make in response to prices. Then there are secular price changes. The prices of some farm products may be increasing over a period of years and the prices of others may be declining or the prices of some may be increasing or decreasing at a faster rate than the prices of others. Secular price changes may be caused by changes in consumer demand, in channels of trade, or in transportation costs or by the opening up of new production areas.

To complicate further the problem the price of each product of a farm may be influenced by a different set of forces. Some farm products are consumed on the farm where they are grown; some are consumed in the immediate vicinity; some are consumed in the large industrial centers and cities of this country; and some are consumed in foreign countries.

For many of the products consumed on the farm there is little outside competition; for many of the products consumed locally there is little competition outside the immediate vicinity; for most of those consumed in the industrial centers and the large cities the

competition is nation-wide and in some cases world-wide; and for those consumed in foreign countries the competition is, in most cases, world-wide. It follows, that in planning a profitable production program a farmer must concern himself with changes taking place in his own home and on his own farm; changes taking place on other farms and the villages and cities in the immediate vicinity; changes taking place in the industrial centers and large cities and competing farming areas of this country; and changes taking place in consuming habits and production in other countries.

Sixth, the farmer can seldom give his entire time to managerial duties. He is a manager, foreman and laborer, and usually can not employ assistants to help with the managerial phase of his problem.

Seventh, the farmer is to some extent isolated. He reads about his problems more often than he talks with others about them and consequently is not stimulated by contacts with others to the same extent as are the entrepreneurs in many other industries.

Summing up, the farming industry of this country is one with a large number of small units, most of which have comparatively inelastic resources, a slow turnover, several lines of production, an output only partially controllable, and a price problem extremely complicated. In addition, generally the farmer must exercise the functions of an entrepreneur, foreman and laborer and is isolated to a greater extent than are the entrepreneurs in many other industries.

## CHAPTER III

## THE DEVELOPMENT OF RESEARCH IN FARM ORGANIZATION

Ever since its establishment in 1862, the United States Department of Agriculture has been conducting experiments in growing crops and in feeding livestock. Since the passage of the Hatch Act in 1887, and in some cases before, experimental work in growing crops and feeding livestock has been done by the State agricultural experiment stations. It was not until early in the present century that economic research in agriculture was attempted.

One of the early publications in this field began as follows: "Every farm is an experiment station and every farmer the director thereon."[4] This sentence characterized the thought at the time. If you would help the farmer with his economic problem, study the farmer and the farm. During this early period, from 1900 to 1915, conditions affecting farm prices were relatively stable and economical production was the chief end, even in farm organization and management work. A better balance between enterprises, more of the crops and livestock that would aid in getting good crop yields, and better utilization of labor and waste products were the chief ends to be attained if profits were to result. Two methods of obtaining data were developed, the accounting method and the survey method. Both of these methods are used in obtaining primary data.

During and following the World War the prices of farm products fluctuated widely. During the war the export demand for some products increased. Following the close of the war the export demand for most of these products and some others declined. The prices of most farm products declined but the prices of some declined more than others. Technological improvements were made, affecting production costs more in some sections than in

[4] Cornell University Experiment Station Bulletin 295, "An Agricultural Survey: Townships of Ithaca, Dryden, Danby, and Lansing, Tompkins County, New York," 1911, pp. 385.

others. Consequently, the farm enterprises that were most profitable during a particular year or period were often least profitable during a later year or period. Confronted with this situation farmers and research workers began to give more attention to factors external to the farm. This resulted in the adaptation and greater utilization of secondary data by which term is meant data not collected specifically for the purpose for which they are used.

In considering the development of research we shall give attention first to methods of obtaining or adapting data and later to methods of using data or methods used in arriving at conclusions. One reason for this classification is that in the beginning attention was focused more largely upon methods of obtaining data whereas in more recent years more attention has been given to methods used in analyzing data and arriving at conclusions. Another reason is that in most cases the objective has been broad or has included several specific objectives.

## METHODS OF OBTAINING DATA

*The accounting method:* In 1902 research work in farm organization and management was begun in Minnesota. During that year three statistical routes were established in three well-defined farming districts with well-defined types of farming.[5]

These routes were first composed of groups of 12 to 15 farms; later, the groups consisted of 8 farms to which assistants or bookkeepers paid daily visits and recorded in detail all operations. Records were kept on the same farms for 5 years or longer. These studies were undertaken jointly by the Minnesota Agricultural Experiment Station and the Federal Department of Agriculture through its Division of Statistics.

Similar work was begun by the Department of Agriculture through the Office of Farm Management in 1908 and by the Illinois Experiment Station in 1912.[6] The records begun by the Office of

[5] W. H. Hays, Andrew Boss, and Thomas Cooper were pioneers in the development of this method. Early publications include Minnesota Experiment Station Bulletin 97, "The Cost of Producing Farm Products," 1906; Minnesota Experiment Station Bulletin 117, "The Cost of Producing Minnesota Farm Products," 1910; Minnesota Experiment Station Bulletin 124, "The Cost of Minnesota Dairy Products," 1911.

[6] United States Department of Agriculture Bulletin 49, "The Cost of Raising a Dairy Cow," 1914; Illinois Experiment Station Bulletin 231, "The Horse and the Tractor, an Economic Study of their Use on Farms in Central Illinois," 1921.

Farm Management were on selected farms in different parts of the country often in cooperation with the State experiment stations. Gradually the responsibility of keeping the records was passed over to the farmer, the bookkeepers becoming record supervisors. This was especially true of the work begun by the Office of Farm Management.

This type of work was rapidly expanded following the close of the World War. By this time one supervisor was handling from 20 to 30 farms where details were recorded for all enterprises and 50 or more farms where details were kept for the principal enterprise and less complete records for the remaining enterprises. In 1920 one or more of these statistical routes were maintained in 17 different states. In practically all cases this work before the passage of the Purnell Act in 1925, was supported jointly by the State experiment stations and the Federal Department of Agriculture through the Office of Farm Management after it was established, and later through the Bureau of Agricultural Economics. Following the passage of the Purnell Act, which provided for additional Federal funds for the states, the State experiment stations gradually took over this type of work. Of the 125 farm organization and management projects reported to the Social Science Research Council in 1927, supervised records were used in 62.[7] Practically all states included the supervision of farm records and accounts as an important extension activity.

The supervised farm records of the present-day may be divided into two groups (1) those closely supervised and (2) those not so closely supervised. The closely supervised records include (a) a complete inventory of the farmers resources (b) a clear day-to-day picture of the work performed on each enterprise on each farm (c) the amounts and the market value of the different kinds of feed and pasturage consumed by the different classes of live stock (d) crop histories including the seed, twine, fertilizer used, and yields obtained (e) daily weather and soil condition reports (f) detailed livestock histories (g) expenses and receipts including the amounts of all items and the enterprise to which all expenditures or receipts belong (h) a farm map showing the farm layout in detail

[7] See preliminary report of a "Survey of Economic Research in Agriculture in the United States during the year, July 1, 1926—June 30, 1927," Vol. II, p. 3.

and (i) the source, quantity and value of all products furnished the family by the various farm enterprises. In obtaining the information indicated one supervisor handles from 20 to 30 records and visits each cooperator from 2 to 4 times each month.

In some cases detailed data as described above are obtained for only one crop or livestock enterprise and inventories, expenses and receipts are obtained for the other enterprises. In such cases one supervisor usually handles from 50 to 75 records and visits each cooperator from 1 to 2 times each month.

The information usually obtained by the less closely supervised records include inventories, feed records, livestock histories, crop histories, expenses and receipts, and the source, quantity and value of the miscellaneous products furnished the family. One supervisor usually handles from 125 to 150 records of this kind and visits each cooperator from 3 to 6 times during the year.

*The survey method:* The so-called survey method appears to have been first used by Cornell University in 1903 in a study of apple growing in Wayne and Orleans Counties for the purpose of determining, among other things, the "average profits as a basis of comparison of the numerous methods of growing crops." In 1906 a comprehensive farm survey was made of three townships of Tompkins County, New York, by the same institution. In 1907, 1908, and 1909 the surveys were extended to other townships of Tompkins and adjoining counties. In 1908 survey records were obtained from approximately 1,000 farmers.[8]

A survey record is obtained by a personal visit to the farm during which the investigator, with a uniform list of questions, obtains from the farmer at one sitting information as to one year's operations. The numerous questions are answered by the farmer from memory or available records, check stubs, cream slips, etc. Such checks are provided as appear practicable and the farmer is called over telephone or a return visit is made when discrepancies are found. The record usually includes complete inventories of

[8] G. F. Warren and W. J. Spillman were pioneers in the development of this method. Early publications include Cornell University Experiment Station Bulletin 295, "An Agricultural Survey: Townships of Ithaca, Dryden, Danby and Lansing, Tompkins County, New York," 1911; Cornell University Experiment Station Bulletin 344, "Agricultural Surveys," 1914; and United States Department of Agriculture Bulletin 341, "Farm Management Practice of Chester County, Pa," 1916.

the farmer's resources as of the beginning and end of the year, the acres and yields of crops, expenses and receipts, and in later years, the value of the products furnished the family. During the early years, sections for sociological data such as the size of the family, education, and previous experience were included. In more recent years sections on farm credit or land utilization and standard of living, have often been included, these supplementary data being turned over to research workers in the appropriate fields for analysis. In many cases data as to the costs of growing crops and feeding livestock and the practices used have been obtained by the survey method. Usually data are obtained for a farm and section for one year. However, in some cases the same farms have been visited year after year for periods ranging from 3 to 10 years.

Following its introduction in New York the use of the survey method was gradually extended until within a few years after the organization of the Federal Office of Farm Management, work of this type had been done in a majority of the states. Many of the early studies were undertaken by the Federal Office of Farm Management independently of the State experiment stations; later most of the studies were joint undertakings and in recent years some of the studies have been undertaken by the State experiment stations in cooperation with the Federal Bureau of Agricultural Economics and some by the State experiment stations independently. Survey records were the principal source of data in 57 of the 125 farm organization and management projects reported in 1927.

As is true for the accounting studies, usually a single survey study is confined to a well-defined type-of-farming area. In the studies of the more recent years, usually from 100 to 300 records are obtained. As contrasted with the accounting method, in which the farms are carefully selected, an effort is usually made to get a random sample.

*The utilization of secondary data:* As pointed out above, few secondary data were used during the early years of farm organization and management research. In 1922 the Federal Bureau of Agricultural Economics began an extensive use of the Census data of 1910 and 1920 in the determination of type-of-farming areas in the United States and changes taking place in the different farm-

ing regions. In this work, state and county averages of acres of crops and number of livestock were used.[9]

Following the Agricultural Census of 1925 the Bureau of Agricultural Economics used the individual farm schedules in determining typical or modal farming systems for the most common sets of farm resources for several important type-of-farming areas. Much of this work was done in cooperation with the State experiment stations. In 16 of the 125 farm organization and management projects reported in 1927, secondary data of this kind were being used.[10]

In addition to the above, secondary data in the form of experimental results of the technical workers in agriculture, crop yields reported by the state and federal departments of agriculture, the results of research in prices, and market quotations reported by state, federal, and commercial agencies have been utilized extensively in recent years in the farm budgeting, as well as in some other studies. This will be discussed in detail in the section on farm budgeting.

## METHODS OF ARRIVING AT CONCLUSIONS

The data obtained as indicated above have not been used solely or even primarily in connection with the farm organization phase of the problem. The objectives of the early studies, in particular, were broad, as indicated by such phrases as "to make comprehensive studies of farm management problems," "to develop principles relating to farm organization and management," and "to determine the factors affecting farm profits." Even in recent years when the objectives have been more specific they have seldom been pointed alone at the farm organization phase of the problem. For example, the objectives of the studies for which the data have been obtained largely by the accounting method have often been stated in recent years as follows: (1) "To determine the

[9] W. J. Spillman and associates developed this phase of the work. See United States Department of Agriculture Farmers' Bulletin 1289, "Distribution of Types of Farming in the United States," 1923.

[10] F. F. Elliott was the leader for the Bureau of Agricultural Economics in most of these studies. See United States Department of Agriculture Technical Bulletin 102, "Types of Farming in North Dakota," 1928; South Dakota Experiment Station Bulletin 238, "Types of Farming in South Dakota," 1929; also see Iowa Experiment Station Bulletin 256, "Types of Farming in Iowa," 1929, by C. L. Holmes, for slightly different use of data of same kind.

most profitable combination of enterprises and the quantity of each for the most common sets of resources in a specific area"; (2) "To determine the methods and practices that are likely to prove most profitable for each of these enterprises"; and (3) "To determine the adjustment between and within enterprises that are likely to be advisable under different conditions."[11] For the most part these statements of the objectives indicate the purposes for which the data have been used. In general, it is true that the data have been used more extensively in connection with the technological or practice phase of the problem than in connection with the purely economic or farm organization phase.

The Advisory Committee on economic and social research in agriculture of the Social Science Research Council in its handbook issued in August, 1928, classifies scientific methods as follows:[12] (1) The method of analogy; (2) the case method; (3) the informal statistical method; (4) the statistical method; and (5) the experimental method. This classification is followed in the following discussion except that the method of analogy is omitted and the budgeting method included. The reason for the omission of the method of analogy is that it is not needed in explaining the budgeting method, which explanation is the chief objective in reviewing the other methods.

The Advisory Committee included budgeting as an operation or procedure under the experimental method.[13] Here it is included as a separate method. While budgeting is a necessary operation of the experimental method the series of operations may be stopped, in fact they have been stopped more often than not, with budgeting as the final operation, and useful results have been obtained. When the experimental method is being considered, case procedure, informal statistical procedure, statistical procedure and budgeting procedure all appear as necessary operations. In the same way when the budgeting method is being considered, the case, informal statistical, and statistical procedures appear as necessary operations. As treated here the budgeting method is

---

[11] See statement of objectives for cooperative farm organization studies undertaken by Bureau of Agricultural Economics and State experiment stations.

[12] "Research Method and Procedure in Agricultural Economics," Vol. 1, pp. 15 to 17, 1928.

[13] The phrase used is a "special hypothetical set-up" which by inference is taken to include the budgeting procedure.

similar in many respects to the modified experimental method as outlined by the Advisory Committee.

*The case method:* The first research work in farm organization consisted in an intensive study of individual cases. In the early accounting studies and in the early work of the Federal Office of Farm Management the case method was used almost exclusively whenever attention was given to the farm organization phase of the problem. In the early New York studies the case method was used along with statistical analysis.

Accounting data lend themselves particularly well to the case method. Data for a few selected farms are available in considerable detail. These data are used in describing particular systems of farming, and in explaining why some have proven profitable and others have not. Good illustrations of profitable systems may also be found among the records obtained by the survey method. The profitable systems found in reconnaissance surveys may be studied carefully and described, as was done by the Office of Farm Management during the first few years after it was established. The practice of describing successful farming systems at the conclusion of studies in which statistical analysis was used has been a popular use of the case method. The case method or a modification of the case method has been used in some way in practically all farm organization studies. At the present time, however, it is used more often to supplement other methods than as the principal method.[14]

*The informal statistical method:* The use of the informal statistical method consists in making observations of a large number of cases and in reaching conclusions without the use of exact statistical measures. Because of the general as contrasted with the exact nature of the observations the method might be called the observational method. It is the method generally used by the business man when he reaches conclusions without the use of definite statistical measures. As contrasted with the case method the informal statistical or observational method usually involves a general understanding of a large number of cases and the case

[14] For illustrations of the use of the case method see United States Department of Agriculture Farmers' Bulletin 312, "A Successful Southern Hay Farm," 1907; United States Department of Agriculture Farmers' Bulletin 364, "A Profitable Cotton Farm," 1917.

method a more exact understanding of a few cases. In practically all studies the informal statistical or observational method is used to some extent.

*Statistical analysis:* The statistical methods that have been used may be classified as follows: (1) Cross-tabulation; (2) simple correlation; and (3) multiple correlation. The cross-tabulation method has perhaps been more extensively used than any other method except the case method. It appears to have been first used in a farm organization study in 1908 by Cornell University in analyzing the data obtained in the Tompkins County survey. It has been used in many farm organization studies made in New York since that time; it was from 1915 to 1920 the principal method used by the Office of Farm Management and has been used as the principal method in one or more studies by most State experiment stations.

Cross-tabulation is essentially a method of discovering relationships. It consists in classifying farms on the basis of some, supposedly causal factor and calculating the average of some other supposedly resulting factor. For example, farms might be classified on the basis of the percentage of the total area in corn and the income calculated for each group. This method is still used extensively in farm organization studies.

Simple correlation is a method of measuring the gross relationship between two variables one of which is called the independent variable and the other the dependent variable. This method was used in connection with some of the first studies and has been used to a greater or less extent as a supplemental method in large numbers of the studies since that time.

Multiple and partial correlation is a method of measuring net relationships when all important factors affecting a particular resultant are taken into consideration. This method appears not to have been used extensively in farm organization studies prior to 1917.[15] Since 1917 it has been developed further, particularly for determining curvilinear relationships and used by the Bureau of Agricultural Economics, and by several of the State experiment

[15] United States Department of Agriculture Bulletin 504, "The Theory of Correlation as Applied to Farm survey Data on Fattening Baby Beef," 1917; also C. C. Taylor, "A Statistical Analysis of Farm Management Data," Journal of Farm Economics, January, 1923.

stations. Altogether it has probably been used to a greater or less extent in the farm organization phase of 25 or more research studies.[16]

*The experimental method:* The experimental method in its pure form is conducted under laboratory conditions and consists in holding constant all the factors affecting a particular resultant except the one under observation. Obviously this is impossible under field conditions, but when combined with correlation analysis it may yield results under field conditions that approximate those that would be obtained under controlled conditions.[17]

The Advisory Committee referred to above suggested a modified form of the experimental method which consists of a trial or series of trials under field conditions of a series of hypothetical organizations or suggested systems of farming and evaluating the systems on the basis of the results obtained. This involves, first, the determination of the sets of resources to be included; second, the determination of the particular enterprise combinations or systems of farming that are to be tried for the various sets of resources; third, the putting into operation and supervision of these systems including the keeping of records; and fourth, the interpretation of the results. This modified experimental method as thus defined has not been used to any great extent in farm organization research. Up to the present no agency has financed projects in which farmers trying the supposedly poor systems have been reimbursed for losses. Consequently, such trials as have been made have included only the supposedly more profitable systems. There have been a number of studies in which the procedure has been similar to that indicated for the modified experimental method but in most of these studies the various systems

[16] H. R. Tolley and Mordecai Ezekiel have been leaders in the development and application of this method. See H. R. Tolley and Mordecai Ezekiel, "A Method of Handling Multiple Correlation Problems," Journal of the American Statistical Association, December, 1923; Mordecai Ezekiel, "A Method of Handling Curvilinear Relationships for any Number of Variables," Journal of the American Statistical Association, December, 1924; also United States Department of Agriculture Bulletin 1400, "Factors Affecting Farmers' Earnings in Southern Pennsylvania," 1926; Virginia Experiment Station Bulletin 257, "Factors Affecting Returns from the Dairy Enterprise in the Shenandoah Valley," 1927; Virginia Experiment Station Bulletin 241, "Causes of Profit or Loss on Virginia Tobacco Farms," 1925; Iowa Experiment Station Research Bulletin 88, "Farm Organization and Farm Profits in Tama County, Iowa," 1925; Iowa Experiment Station Research Bulletin 89, "A Partial Correlation Analysis of Farm Organization and Management Data from Warren County, Iowa." 1925.

[17] See Wesley C. Mitchell, "Quantitative Analysis in Economic Theory," American Economic Review, March, 1925, also M. L. Wilson, and others, "Experimental Method in Economic Research," Journal of Farm Economics, October, 1929.

of farming have been evaluated by the use of the budgeting method rather than by following the third or fourth steps outlined above.

There are a few studies underway in which an attempt is being made to carry through the third and fourth steps. In at least one study the farmers who followed the supposedly improved systems were guaranteed against loss.[18] However, the writer does not know of a study in which the results of the third and fourth have been analyzed and prepared for publication. Extension workers quite generally try to influence farmers to follow the supposedly improved systems and in many cases assist the farmers in keeping records.

## LIMITATIONS

The chief limitation of the methods described above is that they are better adapted to a universe with static conditions than to one with dynamic conditions. They aid in discovering and measuring relationships which existed during a given period but the various forces determining these relationships may be operating in an entirely different manner during the period when the results are to be applied than during the period in which the observations were made. For example, take the use of the case method in which the enterprise combination used and the results obtained by a particular farmer for a given year or period of years are considered in detail. Conditions may so change before the research worker is able to get the case before other farmers that the particular farmer has changed his system of farming materially. Changed conditions may likewise limit the application of the results obtained by the use of the other methods.

During the past few years an attempt has been made to develop a research method that would supplement the other methods and take into account the dynamic nature of the farmer's problem. The method developed has been called, by those using it, the budgeting method. The budgeting method is described and illustrated in the following sections.

[18] The writer has in mind a study in Southwestern Virginia undertaken by the Bureau of Agricultural Economics and the Virginia Experiment Station in which the Virginia Agricultural Experiment Station in 1927 made a guarantee to a few farmers.

## CHAPTER IV

## THE ESSENTIALS OF THE BUDGETING METHOD

The budgeting method is similar to the method of the operator's estimate described by Professor J. M. Clark.[19] In a discussion of the method of the operator's estimate in which he refers to a study made by an architect for the purpose of determining the most economical height for an office building, Professor Clark says: "Selecting a given lot he built upon it, on paper, six different buildings of heights ranging from five stories up to thirty, estimating the total cost of each structure, the cost of operating it and maintaining it and the amount of office space available. This might be called hypothetical statistics, but it differs from statistics in not being forced to cover a multitude of cases and to include masses of irrelevant data in order to sift out the trend of one force. Everything irrelevant is eliminated, and the result is what the experimental scientists would call a 'controlled experiment'—on paper. The method is really the method of hypothetical experiment."

An attempt has been made to adapt this operator's estimate method or method of hypothetical experiment to the problems of research workers in farm organization. The term budgeting is used since the method involves the making of advance estimates.

The use of the budgeting method consists in utilizing such research results as are available and in making such special studies as time and funds will permit in making estimates as to the returns that may reasonably be expected over a period of years for the most common sets of resources in a local area when different systems of farming are followed and then in comparing these systems and evaluating them on the basis of the returns indicated by budget statements.

The budgeting method appears not to have been used extensively by research workers in farm organization until within comparatively recent years. However, as early as in 1907 model

[19] J. M. Clark, "The Economics of Overhead Costs," 1923, pp. 227-8.

farms were outlined and in some cases estimates as to expenses and receipts were made. But such uses of research data were incidental during the early years. No research studies were planned with the view of using an advance estimate method. During the period from 1920 to 1925 several publications appeared that carried outlines for suggested systems of farming similar in part to those presented when the budgeting method has been used. However, it does not appear that advance estimates were made in these studies. Complete budget statements were not presented.[20]

In 1925 an outline for a 400-acre central Kentucky bluegrass farm was carried in a bulletin of the Kentucky Experiment Station. This outline was decided upon after a number of systems had been outlined and complete budgets extended for each. However, the financial part of the budget statement was not carried in the publication. In 1926 the North Carolina Experiment Station presented several standard farming systems each with a complete budget statement. One system was shown for each of several common sets of resources in a local area. In 1927 the Virginia Experiment Station issued a bulletin which carried outlines for suggested systems of farming each with a complete budget statement. From three to four systems were outlined for some of the common sets of resources in a local area. In 1929 the material was published by the Kentucky Experiment Station that is used to illustrate the budgeting method in this study. In this publication several farming systems were outlined for each of the more common sets of resources of the section studied.

The above publications are mentioned because each appears to represent a stage of development of the method. In addition to the studies mentioned the budgeting method has been used in several other studies. To the end of 1929 eight State experiment stations had published the results of one or more studies in which the budgeting method was used. The budgeting method is being used in some unpublished studies. The Federal Bureau of Agri-

[20] See United States Department of Agriculture Bureau of Plant Industry Circular 290, "Model Plan for a Southern Farm," 1907; United States Department of Agriculture Circular 83, "Testing Farms in the South for Efficiency and management," 1920; Alabama Extension Circular 17, "A Guide to a Safe Farming System for North Alabama," 1921; Arkansas Extension Circular 100, "Safe Farming for Arkansas in 1921"; Georgia Experiment Station Bulletin 270, "Systems of Farming for the Piedmont Section of Georgia," 1922.

cultural Economics has cooperated with the State experiment stations in practically all of these studies. In most cases they have been called systems of farming studies.[21]

### TYPE AREAS AND TYPICAL FARMS

The United States may be divided into from 300 to 400, more or less homogeneous areas, commonly called type-of-farming areas. The basis of this division is the similarity of soil, topography, climate, production, prices, and practices. Each of these type-of-farming areas may be considered a unit of study. The first step in a system-of-farming study is to ascertain the most common sets of farm resources and systems of farming in the type-of-farming area under consideration. In this procedure the informal statistical or the statistical method may be used.

If the statistical method is used one or more sub-areas,each consisting of one or more townships, may be selected. Census data for these sub-areas may be used and the farms in these sub-areas sorted by size. This groups the farms of the same size together and gives an idea of the most common sizes as well as the frequency of each size group. Next the prevailing organizations and the frequency of each in each size group are determined. One way to do this is to array the farms in each size group on the basis of the quantity of the most important enterprises and determine the modal quantities in each size group. From these results for the sub-areas generalizations are formed for the type-of-farming area.

If the informal statistical method is used, conclusions as to common sets of resources and systems of farming are formed from

---

[21] See Kentucky Experiment Station Bulletin 259, "Farming with Bluegrass," 1925; North Carolina Experiment Station Research Bulletin 1, "Profitable Farm Organizations for the Coastal Plain of North Carolina," 1926; South Dakota Experiment Station Bulletin 226, "Profitable Farming Systems for East Central South Dakota," 1927; Virginia Experiment Station Bulletin 258, "System of Beef Cattle Farming for Southwestern Virginia," 1927; Wisconsin Experiment Station Bulletin 395, "Planning the Farm for Profits," 1927; United States Department of Agriculture Farmers' Bulletin 1546, "Systems of Livestock Farming in the Black Prairie Belt of Alabama and Mississippi," 1927; North Carolina Experiment Station Bulletin 260, "Systems of Livestock Farming for the Mountain Regions of North Carolina," 1928; South Dakota Experiment Station Bulletin 235, "Profitable Farming Systems for the Intensive Spring Wheat Area of South Dakota," 1928; Mississippi Experiment Station Bulletin 257, "Systems of Farming for the Hill Sections of Mississippi," 1928; Kansas Experiment Station Circular 142, "The Effect of the Combined Harvester-Thresher on Farm Organization in Southwestern Kansas and Northwestern Oklahoma," 1928; Texas Experiment Station Bulletin 395, "Systems of Farming for the Black Waxy Prairie Belt of Texas," 1929.

an examination of such data as are easily available and from observations in the field. In the study illustrated here the informal statistical method was used.

### ESTIMATED PRODUCTION AND PRICE RELATIONSHIPS

The second step is to make advance estimates as to the quantities of cost goods that are required to produce different quantities of products and the prices expected for the products to be sold and the cost goods to be bought. Obviously these estimates are based upon two kinds of data, those relating to production and those relating to prices.

*Production data:* Among the important sources of data on production are the following:

1. Reports showing the results of livestock feeding and experiments of the United States Department of Agriculture and the State experiment stations.
2. Farm data obtained from records kept by or obtained from farmers in the area.
3. Records showing county and State crop yields.

The experimental data are used largely in determining the livestock production that may reasonable be expected when different feeding practices are followed and the yields that result from different fertilizer practices. Farm data show the seasonal and total man labor and horse work requirements for the different enterprises, the kinds of feeds available in the section and give some indication as to the proportion of the total feed one may expect to get from pasturage. The data showing crop yields for a period of years are used in determining the extent to which the yields shown by field and experimental studies were influenced by unusual conditions.

In the analysis of these data, the case method is used largely in determining seasonal man labor and horsework requirements. The statistical method is used largely in determining the product that results from different combinations of cost factors. The informal statistical method is used in the final stages in interpreting the past relationships in terms of existing conditions and prospective developments.

*Price data:* The following are important sources of information on prices:

1. Special commodity price studies issued by the United States Department of Agriculture and many of the States.

2. Yearbooks of the United States Department of Agriculture; yearbooks of State departments of agriculture and State agriculture statiticians.

3. Outlook reports and statistical bulletins issued by the United States Department of Agriculture.

4. Records showing local prices obtained from feed and fertilizer stores, elevators, cooperative associations, and other local agencies.

The results of the special commodity studies made by research workers in prices are used in determining probable price trends and cycles. The yearbooks and statistical bulletins are used as sources of information for such additional price studies as appear advisable. The local price data are used as a means of localizing the results of the price studies and the terminal market price data.

If special price studies are made, multiple correlation methods are used. However, most of the work in this connection consists in comparing short-period data that are available for the local area with such long-period data as may be available for terminal markets and other sections and in interpreting special price studies in the light of existing conditions and prospective developments in the local area. In such work the informal statistical method is used.

### FARM BUDGETS

The end products of the two steps outlined above are used in the third step. Farm budgets are worked out for the most common systems for each of the common sets of resources. In working out these budgets the estimated production and price relationships arrived at as indicated above are used. In some cases the outlines of the more profitable of the systems already in actual operation are taken as a starting point and such changes made as appear advisable in the light of results obtained on other

farms, existing conditions, and developments that appear probable in the immediate future. If present systems appear badly out of adjustment, outlines are prepared for completely new systems. Modifications are then made in these various systems and budgets are worked out for the modified systems. The process is repeated until the more promising alternatives are tried.

Budgets worked out on the basis of these estimated production and price relationships show the net returns that may reasonably be expected from the different systems being considered under usual conditions in the section. The most promising of the systems for particular sets of resources as shown by the budget statements are compared with each other and with the returns being obtained from similar systems in the area at present. Each system is considered critically for the purpose of determining its effect on the fertility of the soil, the kinds of markets available for each of the products to be sold, how well the crops and livestock fit together and how well the non-marketable by-products such as pasture, straw, stover, and skim milk are utilized under each. These various systems that appear promising considering a period of years are then presented and the conditions under which each is likely to be advisable described.

### EXPERIMENTATION

When the budgeting procedure is made a part of the modified experimental method as is suggested by the Advisory Committee referred to above the next step is to influence farmers to try the various systems or find farmers who are already following them and keep a complete record of the results obtained. Since farms are operated under changing conditions it is advisable to adjust these actual returns to a normal or expected basis. The adjusted returns are then compared with the adjusted returns obtained from other systems using similar resources and with those indicated by the budget.

### LIMITATIONS

The budgeting method as it is used at present has some obvious limitations. First, the estimates as to the products that are likely to result from given units of cost factors are based upon average relationships for a particular set of resources whereas it is relationships at the margin and differential costs that should be

considered. For example, in the production of a particular enterprise the output resulting from given units of input may not be constant but may change in an increasing or diminishing ratio. To be accurate, therefore, the budget statement should be based on outputs for given units of inputs rather than on averages. Before this refinement can be made it will be necessary to set up studies to show such relationships since data available at present largely relate to averages.

Another limitation is that modal technical efficiency is assumed for the various enterprises. It is well known that some farmers handle some enterprises relatively more effectively than they handle other enterprises. Until we have better measures for evaluating the ability of entrepreneurs this limitation is likely to exist. However, in applying the conclusion to particular problems it is expected that farmers will take into account their own aptitudes, special abilities and preferences.

An even more serious limitation may be that in some cases the estimates may be considered as certainties rather than as probabilities. It should be made clear that the estimates are nothing more than approximate probabilities and that the cost factors, production and prices shown are not likely to prevail exactly as indicated during any year. Consequently the net returns shown by the budget statements for the different systems are not likely to be obtained during any year. At best they are approximations that appear probable considering a period of years. In order to counteract this tendency to interpret too literally, such terms as assumed or normal yields and prices are often used. In the illustration used here the terms assumed prices and normal requirements and production for crops and livestock are used.

## CHAPTER V

# A STUDY OF SYSTEMS OF FARMING IN THE PURCHASE REGION OF KENTUCKY ILLUSTRATING THE BUDGETING METHOD

The first, second, and third steps of the method outlined above are illustrated with a study in the Purchase Region of Kentucky. In order to avoid repetition, the results of the first and second steps are not shown except as they are used in the third step in which the farm budgets are presented.

### PHYSICAL AND ECONOMIC CONDITIONS IN THE PURCHASE REGION

The agriculture of the Purchase Region of Kentucky is going through a transition stage. The demand for fire-cured tobacco which was the chief crop prior to 1920 has declined and low prices have resulted. Being an export crop, used chiefly in the manufacture of chewing and smoking tobaccos, snuff, and cigars it has been meeting with disfavor for two reasons. First, the world-wide tendency toward the use of cigarettes has caused a curtailment in the consumption of other tobacco products. Second, the expansion of tobacco production in countries formerly importing large quantities of our dark crop has greatly reduced their purchases of this type. During this period expansion has taken place in the production of dairy products, poultry products and fruits.[22]

[22] The Purchase Region of Kentucky is that part of the State lying west of the Tennessee River. It includes eight counties: Marshall, Calloway, Graves, McCracken, Ballard, Carlisle, Hickman, and Fulton.

In 1919, the peak year for dark tobacco production, over 100,000 acres of that crop were grown in these eight counties. By 1924, the acreage devoted to tobacco had been reduced to 61,000 acres, and by 1927 further reductions had brought this figure below 25,000 acres. This is less than half the acreage grown either in 1909 or in 1899, and less than that grown in 1889 or 1879.

The strawberry acreage which, in 1919, was only about 100 acres, by 1924 had increased to 1,200 acres. During the same period the number of chickens on farms increased about 50,000 and the number of dairy cows became nearly 1,000 greater. Since 1924 the growth of these enterprises has been even more marked. Interest in dairying was greatly stimulated when a milk condensary was established in Graves County at Mayfield, Kentucky in the spring of 1927. More than three times as many strawberries were grown commercially in the area in 1927 as in 1924. Expansion has taken place in the acreage of peaches, apples, dewberries, sweet potatoes and tomatoes. Many farmers have taken up other occupations. The United States census shows that the number of people living on farms in the region in 1925 was only 84,000 as compared with 99,000 in 1920 and 104,000 in 1910.

It is likely, however, that some tobacco can be produced advantageously in the Purchase for a considerable number of years. The barns and equipment are suited to its production and many soils in the section are especially adapted to the growth of a high-quality product. Most farmers have had long experience in handling the crop and know how to grow it better than they know how to do anything else.

This situation has given rise to a number of perplexing questions. Among these are the following: Should the tobacco acreage be decreased still further, or should it be increased? What crops and livestock are likely to prove more profitable? On a given farm what is a good proportion between the cash crops and feed crops? What kinds of feed and how many acres of feed crops are needed for the livestock? What crops and livestock fit together to best advantage? Farmers are answering these questions in different ways. Some have been successful in making adjustments to meet the changed situation and are getting good returns. Others, following systems and practices of former years, are making little progress.

## NATURE OF THE STUDY

In view of the difficulties confronting the farmers of the Purchase Region an economic study of the agriculture was begun in the spring of 1924 by the Department of Farm Economics of the Kentucky Agricultural Experiment Station and the Bureau of Agricultural Economics of the United States Department of Agriculture. This study was continued in 1925 and 1926. The purpose of the investigation was to determine what farmers are doing to meet the changed conditions and what they may do in order to meet them better. Much attention was given to the systems used by successful farmers. Costs and returns were studied for the crops and livestock that are proving profitable, and the possibilities of new crops and livestock were considered.

For the most part the accounting method of obtaining data was used. Farmers of a carefully selected group were visited at regular intervals and assisted in keeping a complete record of all farming operations. Considerable investigation was done preliminary to the actual work of gathering the data and during the period covered by the study about twelve hundred persons were

interviewed. Additional data were obtained from many other sources. The data obtained include the following:

*Farm returns:* Records were obtained showing the number of acres operated, the number of men on the farm, acres in crops, number of livestock, crop yields, livestock production, farm expenses and farm receipts, including the value of products used in the home. Fifty of these records were obtained in 1924, 200 in 1925 and 50 in 1926.

*Requirements for producing crops and livestock:* Detailed records were obtained showing the amounts of man labor, horse work, seeds, fertilizer, and other materials used in producing each of the crops, and the amounts of feed, pasturage, man labor, horse work, and other materials used for each class of livestock. These data were obtained from 19 farms in 1924, 12 in 1925, and 14 in 1926. Additional records showing similar requirements for various crops and livestock were obtained, 9 of these being for sweet potatoes, 11 for alfalfa, 9 for cotton, 19 for wheat, 6 for peaches, 8 for sheep, 54 for dairy cattle, and 5 for poultry.

*Yields of crops and production of livestock:* Data have been brought together showing the crop yields that have been obtained in the section in recent years. The results obtained on the Lone Oak and Mayfield Soil Experiment Fields and other experimental data on crop and livestock production applicable to conditions in the section have been carefully reviewed. These data show the crop yields resulting from different fertilizer treatments and practices, and the livestock production resulting from different feeding practices.

*Prices for expense items:* Data were obtained showing the prices paid from 1921 to 1927 for feeds, seeds, fertilizers, and other materials bought, and the rates paid for labor hired. These data were obtained from representative feed, seed and fertilizer stores in the section and the market reports of the United States Department of Agriculture.

*Prices for products sold:* Data were obtained showing the prices received in recent years for tobacco, wheat, strawberries, milk, butterfat, hogs, eggs, poultry, and other products. The data were obtained from local cooperative associations, private trade organizations, and market reports and price studies of the United States Department of Agriculture.

### BASIS FOR CONCLUSIONS

The data described above have been used in arriving at conclusions as to the returns that may reasonably be expected from the different systems of farming that are being or that may be followed in the region. Some of the actual systems, each typical of those followed on a large number of farms, are described, and suggested systems that combine the strong points of the more profitable of the actual systems are presented. In each case the outstanding weaknesses of the actual systems are pointed out and the conditions to which the suggested systems are applicable described. Actual and suggested systems are shown for farms of 60, 80, 100, 150, 200 and 300 acres each.

The purpose of presenting these actual and suggested systems is to help farmers in determining for their own farms the possibilities of the different systems that are being or that may be followed advantageously. In working out the outlines for suggested systems the most profitable actual systems have been taken as the starting point and such changes made as seem advisable in the light of results being obtained on other farms.

The acres of crops, the numbers of livestock, the expenses, receipts and net returns obtained from the actual systems during a given year are shown. Then the returns that appear probable from these systems under usual conditions in the section are calculated. The acres of crops and numbers of livestock are also shown for suggested systems and the normal or expected returns calculated. The reason for working out expected returns for the actual systems is to put all of them on the same basis, so that they may be more easily compared with each other and with the suggested systems.

The expected returns for the actual systems are based on the crop and livestock requirements and the livestock production that prevailed during the year for which actual records were obtained. They are based on normal crop yields for the particular system being considered; that is, yields that represent the average expectation for a period of years.

The suggested systems are based on normal crop and livestock requirements, yields, and production as shown in Tables 1 and 2. Conclusions as to these normal data are based upon the results obtained on farms in the section during 1924, 1925 and

**TABLE 1. Normal production requirements and yields for crops (Acre basis)**

| Crop | Man Labor Hrs. | Horse Work Hrs. | Other Requirements[1] | | Yields |
|---|---|---|---|---|---|
| | | | Kind | Amt. | |
| Corn harvested from standing stalk | 27 | 42 | Seed, lbs.<br>Superphosphate, lbs.[2]<br>Equipment expense, dolls. | 7<br>400<br>.75 | 35 bus. grain |
| Corn cut by hand and husked from shock | 40 | 40 | Seed lbs.<br>Superphosphate, lbs.[2]<br>Twine, lbs.<br>Equipment expense, dolls. | 7<br>400<br>2<br>.75 | 35 bus. grain<br>2300 lbs. stover |
| Corn silage | 48 | 52 | Seed, lbs.<br>Superphosphate, lbs.[3]<br>Filling costs, dolls.[3]<br>Silo expense, dolls.<br>Equipment expense, dolls. | 10<br>400<br>2.25<br>2.00<br>1.40 | 7 tons |
| Soybean hay | 20 | 35 | Seed, bus.<br>Equipment expense, dolls. | 1.25<br>.75 | 3000 lbs. |
| Japan clover hay | 9 | 10 | Seed, lbs.<br>Equipment expense, dolls.<br>Limestone, tons | 8<br>.50<br>2 | 2000 lbs.<br><br>2500 lbs. |
| Mixed clover hay[4] | 11 | 12 | Seed:<br>Red clover, lbs.<br>Alsike, lbs.<br>Alfalfa, lbs.<br>Orchard grass, lbs.<br>Equipment expense, dolls. | <br>3<br>1<br>3<br>5<br>.60 | |
| Wheat | 15 | 22 | Seed, bus.<br>Twine, lbs.<br>Threshing (contract), dolls.[5]<br>Equipment expense, dolls. | 1.25<br>2<br>1.68<br>.75 | 14 bus. grain<br>1200 lbs. straw |
| Tobacco | 250 | 90 | Fertilizer (5-9-4), lbs.[6]<br>Wood for plant beds and curing, lds.<br>Canvas, yds.[7]<br>Arsenate of lead, lbs.<br>Building expense, dolls<br>Equipment expense, dolls. | 500<br>4<br>20<br>4<br>5.00<br>1.50 | 950 lbs. |
| Strawberries[8] | 270 | 135 | Plants, number<br>Superphosphate, lbs.[2]<br>Straw (mulching), tons<br>Crates, number<br>Building expense, dolls.<br>Equipment expense, dolls.<br>Picking, dolls.<br>Grading and crating, dolls. | 4500<br>400<br>2<br>140<br>1.00<br>3.00<br>112.00<br>28.00 | 140 24-qt. crates |
| Sweet-potatoes | 140 | 100 | Seed, bus.<br>Fertilizer (2-10-12), lbs.[9]<br>Manure, tons[10]<br>Corrosive sublimate, ozs.<br>Equipment expense, dolls. | 4<br>250<br>1.5<br>2<br>1.50 | 130 bus. |
| Tomatoes (canning) | 160 | 120 | Seed, ozs.<br>Superphosphate, lbs.[2]<br>Canvas, yds.[7]<br>Equipment expense, dolls. | 2<br>500<br>18<br>1.50 | 175 bus. |
| Rye (cover crops)[11] | 4 | 10 | Seed, bus.<br>Equipment expense, dolls. | 1.5<br>.30 | |

**TABLE 1. Normal production requirements and yields for crops (Continued) (Acre basis)**

| Crop | Man Labor Hrs. | Horse Work Hrs. | Other Requirements[1] | | Yields |
|---|---|---|---|---|---|
| | | | Kind | Amt. | |
| Pasture mixture[12] | 4 | 10 | Seed: | | |
| | | | Japan clover, lbs. | 5 | |
| | | | Orchard grass, lbs. | 5 | |
| | | | Redtop, lbs. | 3 | |
| | | | Sweet clover, lbs. | 4 | |
| | | | Equipment expense, dolls. | .20 | |

[1] The building and equipment expenses include repairs, depreciation and insurance. Interest and taxes are not included. If interest and taxes were included the charges would be about twice those shown for buildings and about 50 percent larger than those shown for equipment. [2] The application consists of only half this amount when the crop follows another cultivated crop on which 400 lbs. have been used. [3] For power and one man. [4] Man labor and horse work include applying limestone but do not include hauling limestone. [5] For power, machine and 2 men at 12 cents per bushel. [6] Home-mixed. See footnote 1, Table 3. The application consists of only 350 lbs. where tobacco follows a cultivated crop on which 400 lbs. of superphosphate have been used. [7] Good quality canvas usually lasts 3 years. Only one-third the amount shown is bought each year. [8] Requirements and yields for 3 years, 2 harvested crops. For each acre harvested half the requirements shown would be used and half the yields shown would be obtained. [9] Home-mixed, equivalent to 312 lbs. of 2-8-10. See footnote 2, Table 3. The application consists of only three-fourths this amount when sweetpotatoes follow a cultivated crop on which 400 lbs. of superphosphate or 500 lbs. of 5-9-4 have been used. [10] For hotbed. [11] When seeded in standing corn, either with one-horse drill or broadcast and plowed in, only 2 hours of man labor and 1.5 hours of horse work will be needed. [12] For unlimed ground omit sweet clover seed from this mixture. When seeded in small grain only one hour of man labor and no horse work will be needed.

1926, as indicated by carefully kept records, the results obtained on the Lone Oak and Mayfield experiment fields, other experimental data on crop and livestock production applicable to conditions in the area and data showing the crop yields that have been obtained on other farms in the section during recent years.[23]

The hours of man labor and horse work and the amounts of seed, fertilizer, feed and other materials shown for the different crop and livestock enterprises are conservative approximations. In the requirements for crops some allowance is made for breakdowns and unfavorable seasons. The requirements for livestock are large enough to take care of a reasonable amount of death losses. In calculating the man labor and horse work requirements for the different systems, amounts in addition to those required for crops and livestock are included for garden and

[23] See Kentucky Experiment Station Bulletin 289, "An Economic Study of Crops and Livestock in the Purchase Region of Kentucky."

**TABLE 2.** Normal production requirements and production for livestock (Head basis)

| | Production Requirements[1] | | | | Production | |
|---|---|---|---|---|---|---|
| | | Combination 1[2] | Combination 2 | Combination 3 | Kind | Amount |
| Dairy cows | Corn, bus. | 16 | 16 | 16 | Whole milk, lbs. | 5000 |
| | Bran and shorts, lbs. | 200 | 100 | — | or | |
| | Cottonseed meal, lbs. | 100 | 300 | 200 | Butterfat, lbs. | 225 |
| | Soybean hay, lbs. | 1500 | — | 1800 | Skim-milk, lbs. | 4435 |
| | Mixed clover hay, lbs. | 1000 | 2500 | — | | |
| | Corn stover, lbs. | 1000 | 1000 | — | | |
| | Silage, lbs. | — | — | 4500 | | |
| | Pasture, acres | 2 | 2 | 2 | | |
| | Man labor, hrs. | 150 | 150 | 150 | | |
| | Horse work, hrs. | 10 | 10 | 10 | | |
| | Building expense, dolls. | 3 | 3 | 3 | | |
| | Equipment expense, dolls. | 1.50 | 1.50 | 1.50 | | |
| | Miscellaneous, dolls. | 2.50 | 2.50 | 2.50 | | |
| Veal calves | Whole milk, lbs. | 480 | | | Veal, lbs. | 140 |
| | Man labor, hrs. | 5 | | | | |
| | Horse work, hrs. | 1 | | | | |
| Dairy calves (Birth to 1 year of age) | Corn, bus. | — | 1 | | | |
| | Bran and shorts, lbs. | — | 30 | | | |
| | Linseed meal, lbs. | — | 10 | | | |
| | Skim-milk, lbs. | 1200 | — | | | |
| | Whole milk, lbs. | 50 | 480 | | | |
| | Legume hay, lbs. | 200 | 200 | | | |
| | Pasture, acres | .5 | .5 | | | |
| | Man labor, hrs. | 10 | 10 | | | |
| | Horse work, hrs. | 1 | 1 | | | |
| | Building expense, dolls. | .30 | .30 | | | |
| | Miscellaneous, dolls. | .10 | .10 | | | |
| Dairy heifers[3] (1 to 2 years of age) | Corn, bus. | 2 | 2 | | | |
| | Bran and shorts, lbs. | 100 | 100 | | | |
| | Legume hay, lbs. | 1000 | 500 | | | |
| | Silage, lbs. | — | 1500 | | | |
| | Pasture, acres | 1.5 | 1.5 | | | |
| | Man labor, hrs. | 10 | 10 | | | |
| | Horse work, hrs. | 1 | 1 | | | |
| | Building expense, dolls. | .50 | .50 | | | |
| | Miscellaneous, dolls. | .20 | .20 | | | |
| Sheep, per mature head | Corn, bus. | 1.5 | 1.12 | .5 | Lambs, lbs. | 70 |
| | Oats, bus. | — | .75 | .75 | Old sheep, lbs. | 11 |
| | Bran and shorts, lbs. | — | — | 24 | Wool, lbs. | 7 |
| | Linseed oil meal, lbs. | 2.5 | — | 8 | | |
| | Silage, lbs. | — | — | 400 | | |
| | Legume hay, lbs. | 325 | 325 | 200 | | |
| | Pasture, acres | .4 | .4 | .4 | | |
| | Man labor, hrs. | 6 | 6 | 6 | | |
| | Horse work, hrs. | 1.5 | 1.5 | 1.5 | | |
| | Building expense, dolls.[4] | .30 | .30 | .30 | | |
| | Miscellaneous, dolls. | .02 | .02 | .02 | | |
| Hogs, 1 sow and 8 pigs | Corn, bus. | 104 | 112 | | Pork | |
| | Tankage, lbs. | — | 320 | | Live weight, lbs. | 1600 |
| | Skim-milk, lbs. | 4400 | — | | | |
| | Pasture, acres | 1.5 | 1.5 | | | |
| | Man labor, hrs. | 80 | 80 | | | |
| | Horse work, hrs. | 16 | 16 | | | |
| | Building expense, dolls.[4] | 1.60 | 1.60 | | | |
| | Miscellaneous, dolls. | 2.25 | 2.25 | | | |

**TABLE 2. Normal production requirements and production for livestock (Continued)**
**(Head basis)**

| | Production Requirements[1] | | | | Production | |
|---|---|---|---|---|---|---|
| | | Combination 1[2] | Combination 2 | Combination 3 | Kind | Amount |
| Poultry, per mature bird | Corn, grain, bus. | 1.25 | 1 | 1 | Eggs, dozs. | 9 |
| | Corn, ground, lbs. | — | 10 | 10 | Fryers, lbs. | 4 |
| | Bran and shorts, lbs. | — | 15 | 20 | Hens, lbs. | 4 |
| | Meat scrap, lbs. | — | 1 | 5 | | |
| | Oyster shell, lbs. | 4 | 4 | 4 | | |
| | Skim-milk, lbs. | 130 | 80 | — | | |
| | Baby chick feed, lbs. | 2 | 2 | 2 | | |
| | Pasture, acres | — | — | — | | |
| | Man labor, hrs. | 4 | 4 | 4 | | |
| | Horse work, hrs. | .3 | .3 | .3 | | |
| | Building expense, dolls.[4] | .20 | .20 | .20 | | |
| | Miscellaneous, dolls. | .01 | .01 | .01 | | |
| Work stock, per head | Corn, bus. | 40 | | | Hours of work | 1000 |
| | Mixed hay, lbs. | 3500 | | | | |
| | Pasture, acres | 1.25 | | | | |
| | Man labor, hrs. | 45 | | | | |
| | Horse work, hrs. | 6 | | | | |
| | Building expense, dolls. | 3.50 | | | | |
| | Equipment expense, dolls. | 2.00 | | | | |
| | Depreciation, dolls. | 7.00 | | | | |
| | Miscellaneous, dolls. | 1.75 | | | | |

[1] See footnote 1, Table 1, page 33. [2] Only one of these feed combinations is used at a given time, the particular combination depending upon the kind of feeds grown and the prices of the different feeds. [3] In each system enough dairy heifers are included to keep up the herd. For each dairy heifer kept a cull cow weighing 600 lbs. would be sold. The average weight of the cull cows would probably be between 650 and 700 lbs., the difference being deducted because of death losses. [4] Includes equipment expense.

truck crops, work around the house and general upkeep for land, buildings, fences and equipment. Fifteen percent of the man labor and ten percent of the horse work for the crops and livestock are added for these overhead items. In each system provision is made for growing enough young stock, in addition to the sales reported, to replace the old livestock, except in the case of work stock. A normal depreciation expense is included for work stock.

The crops yields and livestock production for the suggested systems represent results that may reasonably be expected, under usual conditions in the section, from the requirements shown when the crop rotations, fertilizer, feeding and pasture

practices indicated are followed and fair to good management is applied. Many farmers get larger crop yields and higher livestock production from requirements and practices similar to those indicated.

Normal building and equipment expenses are included for each system. These expenses include depreciation, repairs and insurance for the buildings and equipment used for the different enterprises, but do not include interest and taxes. The expenses shown are based upon the actual expenditures for repairs and insurance and estimates as to depreciation on the buildings and equipment used on the farms studied in 1924, 1925 and 1926, and similar data for other sections in which the conditions are similar to those in the Purchase.

Normal fence expenses are arrived at in a manner similar to that for buildings and equipment and used for both the actual and suggested systems, the rate varying with the size of the farm. The rates used in calculating the fence expenses are as follows:[24]

| | |
|---|---|
| 60-acre farms | 60 cents per acre |
| 80-acre farms | 55 cents per acre |
| 100-acre farms | 50 cents per acre |
| 150-acre farms | 45 cents per acre |
| 200-acre farms | 40 cents per acre |
| 300-acre farms | 30 cents per acre |

Expenses for auto when used for farm business are included for each system. Automobile expenses include depreciation, repairs, gas, oil and license fees.[25] Actual expenses as shown by records and farmers' estimates for these items are included for each actual system. These records and estimates are used in arriving at rates for the suggested system which are as follows:

| | |
|---|---|
| 60-acre farms | $75 per farm |
| 80-acre farms | 80 per farm |
| 100-acre farms | 90 per farm |
| 150-acre farms | 105 per farm |
| 200-acre farms | 120 per farm |
| 300-acre farms | 135 per farm |

[24] If interest and taxes were included the fence expenses would be about fifty percent higher than those shown.

[25] If interest and taxes were included the automobile expenses would be about ten percent higher than those shown.

The actual cash expenses for the home orchard and garden, and sales of fruit, garden and truck products are included in the statements for the actual systems. Usually the cash sales of these products equal or exceed the cash expenses for them. In the statements for the suggested systems neither of these items is included. An estimated figure for the garden and truck products furnished the household is included for each actual and suggested system. The value of marketable livestock products furnished the household is also included for each system.

The prices used in calculating the expected returns for the actual and suggested systems are shown in Table 3. While the conclusions as to these prices were reached after a careful study of prices that have prevailed in the section in recent years it is not intended that they shall be used as price forecasts. Under the conditions existing during the period covered by this study the prices shown appear to represent reasonable relations for the area.[26] However, in making similar calculations at any given time it will be necessary for farmers to make their own assumptions as to the prices that will be applicable to conditions on their own farms.

The crop yields, livestock production, crop and livestock requirements and prices shown in the foregoing tables are not likely to prevail during any one year. They are intended to represent average relationships considering a period of years. When they are combined in working out expected net returns for different systems the results are believed to represent reasonable expectations, under usual conditions in the section, for systems similar to those shown.

## CHARACTERISTICS OF PROFITABLE SYSTEMS OF FARMING IN THE PURCHASE

A study of the possibilities of the different crops and livestock, as reported in Kentucky Experiment Station Bulletin No. 289, and the experiences of successful farmers in the section show that the systems of farming that are proving most profit-

[26] See Kentucky Experiment Station Bulletin 289, "An Economic Study of Crops and Livestock in the Purchase Region of Kentucky."

**TABLE 3. Assumed relative prices for products to be sold and expense items.**

| Products to be Sold | | Expense Items | |
|---|---|---|---|
| Item | Price | Item | Price |
| Cash crops: | Dolls. | Feeds: | Dolls. |
| Wheat ... per bu. | 1.30 | Bran and shorts per 100 lbs. | 1.80 |
| Tobacco ... per lb. | .10 | Cottonseed meal ... per 100 lbs. | 2.20 |
| Strawberries per 24-qt. cr. | 3.00 | Linseed oil meal ... per 100 lbs. | 3.00 |
| Sweetpotatoes ... per bu. | .50 | Tankage ... per 100 lbs. | 3.90 |
| Tomatoes for canning ... per bu. | .40 | Meat scrap ... per 100 lbs. | 4.50 |
| Livestock: | | Oyster shell ... per 100 lbs. | 1.00 |
| Whole milk ... per 100 lbs. | 2.10 | Baby chick feed ... per 100 lbs. | 5.00 |
| Butterfat ... per lb. | .38 | Oats ... per bu. | .65 |
| Veal ... per lb. | .08 | Fertilizer: | |
| Cull cows ... per lb. | .04 | Superphosphate per 100 lbs. | 1.10 |
| Lambs ... per lb. | .10 | 5-9-4 (tobacco)[1] per 100 lbs. | 2.00 |
| Wool ... per lb. | .36 | 2-10-12 (sweetpotatoes)[2] ... per 100 lbs. | 1.75 |
| Cull ewes ... per lb. | .03 | Seeds and plants: | |
| Hogs ... per 100 lbs. | 8.75 | Soybeans ... per bu. | 2.40 |
| Eggs ... per doz. | .25 | Japan clover ... per lb. | .10 |
| Fryers ... per lb. | .26 | Red clover ... per lb. | .30 |
| Hens ... per lb. | .18 | Alsike clover ... per lb. | .25 |
| | | Alfalfa ... per lb. | .23 |
| | | Sweet clover ... per lb. | .18 |
| | | Orchard grass ... per lb. | .18 |
| | | Redtop ... per lb. | .20 |
| | | Rye ... per bu. | 1.40 |
| | | Strawberry plants per 1000 | 3.50 |
| | | Tomato seed ... per oz. | .25 |
| | | Miscellaneous: | |
| | | Twine ... per lb. | .16 |
| | | Canvas ... per yd. | .05 |
| | | Arsenate of lead ... per lb. | .25 |
| | | Corrosive sublimate per oz. | .15 |
| | | Strawberry crates ... per cr. | .34 |
| | | Baling hay ... per ton | 2.40 |
| | | Limestone[3] ... per ton | 3.25 |

[1] This home-mixed fertilizer containing approximately 5% nitrogen, 9% phosphoric acid and 4% potash, consists of the following:

| | | | |
|---|---|---|---|
| Superphosphate | 1150 lbs. | @ $1.10 | $12.65 |
| Nitrate of soda | 675 lbs. | @ 3.50 | 23.62 |
| Muriate of potash | 175 lbs. | @ 2.50 | 4.38 |
| | 2000 lbs. | | $40.65 |

[2] This home-mixed fertilizer containing approximately 2% of nitrogen, 10% of phosphoric acid and 12% of potash, consists of the following:

| | | | |
|---|---|---|---|
| Superphosphate | 1240 lbs. | @ $1.10 | $13.64 |
| Nitrate of soda | 265 lbs. | @ 3.50 | 9.28 |
| Muriate of potash | 495 lbs. | @ 2.50 | 12.38 |
| | 2000 | | $35.30 |

[3] Includes cost of limestone at the unloading point and $1.00 per ton for hauling.

able and that are likely to continue most profitable generally have several of the following characteristics:

1. Two or more important sources of income, including at least one cash crop, for which the section has advantages as compared with other enterprises.
2. One or more minor sources of income.
3. All livestock products, truck crops and fruit adapted to the section that are needed in the household produced on the farm.
4. A crop and livestock program that will maintain or improve the fertility of the soil.
5. Crops and livestock so balanced as to utilize the legumes, pastures and non-marketable by-products to good advantage and provide good rations for the livestock.
6. No more mature work stock than are needed to provide the necessary horse work.
7. Crops and livestock such that the man labor and horse work requirements are well distributed thruout the year.
8. Practices in growing crops and handling livestock such that yields and production approach recognized standards.

Some of the systems now being followed have more of these characteristics than others. Each of them appears to be important for profits. Provision is made for all of them in outlining each of the suggested systems presented in the sections that follow.

*Important sources of income*: A small acreage of tobacco is included in practically every suggested system and strawberries are included in a considerable number of them. On some of the larger farms the wheat acreage is sufficient to provide an important source of income. Each system has dairy cattle and a few of them poultry as important sources of income. These are crops and livestock for which the Purchase has superior advantages as compared with other enterprises. Three or more of them are included as major sources of income in each suggested system.

*Minor sources of income*: Hogs are included as a minor source of income in most of the suggested systems. Poultry is a minor source of income in the systems in which it is not a major source. Sweetpotatoes, tomatoes, wheat and sheep are minor sources in some systems. Two or more of these are included as minor sources in each suggested system.

*Products used in the home*: Each suggested system provides for all the dairy products, pork and poultry products needed in the home. In addition an abundance of garden, truck and fruit products is provided for.

*Soil fertility*: Each suggested system provides for the use of limestone, superphosphate and manure. Crop rotations, legumes, cover crops and pastures are included. The crop and livestock program for each suggested system will maintain or improve the fertility of the soil so that good crop yields and economical crop production are possible.

*Balance between crops and livestock*: The prices of feed crops are such in the Purchase that few farmers can profitably grow feed crops for sale. Except in the case of exceptional markets the prices of livestock products are such that few farmers can afford to buy any considerable quantity of feed. The crops and livestock of the suggested systems are so balanced that good farm-grown rations are provided for the livestock, and practically all crop and livestock by-products are utilized to good advantage. Dairy cattle utilize such feeds as corn stover and the legumes and pastures needed for the maintenance of soil fertility. Hogs and poultry utilize the skim-milk.

*Work stock*: The profits on many farms in the Purchase are largely absorbed by surplus work stock. In the suggested systems only enough work stock are included to care for the crops and the other livestock.

*Man labor and horse work distribution*: The peak loads of man labor and horse work during the growing season, particularly in planting and harvesting, determine the acres of crops that can be handled advantageously. Usually a larger number of acres of cash crops can be handled if more than one kind is grown. For example, 3 acres of strawberries and 3 acres of tobacco can be handled about as easily as 4 acres of tobacco. The heaviest requirements for livestock are during the winter season, consequently a larger business can be handled if cash crops and livestock are combined. In each of the suggested systems the cash crops, feed crops and livestock included give a good distribution of man labor and horse work requirements thruout the year.

*Good practices*: The crops and livestock of the suggested systems are combined so as to permit the feeding of good home-grown rations to the livestock and to permit timely operations in planting and cultivating crops. The kinds and amounts of fertilizer are provided that result in good crop yields. In each case ample provision is made for good pastures so that economical livestock production may be obtained.

### SYSTEMS FOR 60-ACRE FARMS

The acres of crops and numbers of livestock, hours of man labor and horse work and expected returns for systems actually followed on three farms of approximately 60 acres each and for three suggested systems for 60-acre farms are shown in Table 4. Each actual system is typical of those being followed on a large number of the smaller farms in the section.

In arriving at the expected returns a detailed farm budget, showing the hours of man labor and horse work and other costs and the production for each crop, and the hours of man labor and horse work, the amounts of home-grown and purchased feeds and other costs and production for each class of livestock, has been carefully worked out for each system. (See Table 5 for a complete budget). As explained in a preceding section, normal requirements and production and assumed relative prices were used in working out these budgets. The expected net returns shown in Table 4, and those shown in the similar tables that follow, are believed to be near enough those that will actually be obtained from systems similar to those indicated, considering a period of years, to permit a fairly accurate appraisal of each system.

Under usual conditions in the section the chances appear about equal for a net return of approximately $550 from systems similar to actual system 1, $700 from systems similar to actual system 2, $1025 from systems similar to actual system 3, $1200 from systems similar to suggested system 1, $1225 from systems similar to suggested system 2 and $1450 from systems similar to suggested system 3 (See Table 4).

**TABLE 4. Summary of three actual and three suggested systems[1] (60-acre farms)**

| | Actual System 1 | Actual System 2 | Actual System 3 | Suggested System 1 | Suggested System 2 | Suggested System 3 |
|---|---|---|---|---|---|---|
| Acres | 58 | 54 | 65 | 60 | 60 | 60 |
| Value of farm, dolls.[2] | 2400 | 2700 | 3075 | 3000 | 3500 | 3500 |
| Livestock, equipment and feed, dolls. | 742 | 675 | 1797 | 1600 | 1600 | 1450 |
| Number of men | 1 | 1 | 1 | 1[3] | 1[3] | 1[3] |
| Number of work stock | 4 | 3 | 3 | 2 | 2 | 2 |
| Acres in crops: | | | | | | |
| Corn for grain | 18 | 13 | 15 | 12 | 10 | 12 |
| Cowpea or soybean hay | 5 | 2 | — | 1 | — | — |
| Mixed clover hay | — | — | 15 | 8 | 10 | 7.5 |
| Japan clover hay | — | 12 | 7[4] | — | 1 | — |
| Wheat | — | — | — | 8 | — | 6 |
| Rye, cover crop and pasture | — | — | — | — | 1 | 1.5 |
| Tobacco | 4 | 2 | 4 | 3 | 2 | 3 |
| Strawberries (harvested) | — | 2 | 1 | — | 2 | 3 |
| Strawberries (young) | — | 1 | .5 | — | 1 | 1.5 |
| Other truck | 1 | .25 | .5 | 2 | 2 | 2 |
| Pasture | 21 | 9 | 21 | 16 | 22 | 15 |
| Hours man labor on crops | 1435 | 917 | 1890 | 1354 | 1327 | 1741 |
| Hours horse work on crops | 1190 | 834 | 1445 | 1073 | 960 | 1216 |
| Number of livestock: | | | | | | |
| Dairy cows | 2 | .1 | 4 | 6 | 8 | 5 |
| Bull | — | — | 1 | — | — | — |
| Dairy heifers (1 to 2 yrs.) | — | 1 | 1 | 2 | 2 | 2 |
| Dairy calves (under 1 yr.) | — | 1 | 2 | 2 | 2 | 2 |
| Veals | — | — | — | 3 | 5 | 2 |
| Sows | — | — | 2 | 1 | — | 1 |
| Other hogs | 3 | 4 | 20 | 8 | 2 | 8 |
| Poultry | 50 | 68 | 64 | 100 | 90 | 125 |
| Hours man labor on livestock | 696 | 617 | 1441 | 1525 | 1735 | 1470 |
| Hours horse work on livestock | 58 | 65 | 130 | 123 | 130 | 120 |
| Farm receipts, dolls. | 449 | 1109 | 1743 | 1435 | 1706 | 1958 |
| Products used in household, dolls. | 231 | 351 | 332 | 324 | 326 | 324 |
| Farm expenses, dolls. | 273 | 408 | 769 | 555 | 812 | 832 |
| Net return: | | | | | | |
| Actual, dolls. | 407 | 1052 | 1356 | — | — | — |
| Expected, dolls. | 554 | 704 | 1019 | 1204 | 1220 | 1450 |

[1] A detailed budget for suggested system 3 is shown on pages 51, 52 and 53. Detailed budget for suggested systems 1 and 2 are shown in the appendix on pages 96 to 104. [2] Excluding value of the residence. [3] An additional man will be required for 1 to 1.5 months during the crop growing season. [4] Oat hay.

Each of these figures represents the excess of sales over farm expenses, plus the value of the products furnished the household. No deductions are made for man labor and management, or interest and taxes on the investment in land, buildings, livestock, machinery and other equipment, and consequently the expected net returns are the amounts left for labor and management and return on investment.

Expenses for maintaining the necessary work stock are included along with the expenses for other livestock. The total

horse work requirements are about the same for the suggested systems as for the actual systems. However, the better balance between the different enterprises in the suggested systems makes it possible to do the work with fewer horses.

The seasonal distribution of man labor and horse work for each of these systems is shown in Figures 1 and 2. Fewer hours of man labor are used with actual systems 1 and 2 then are

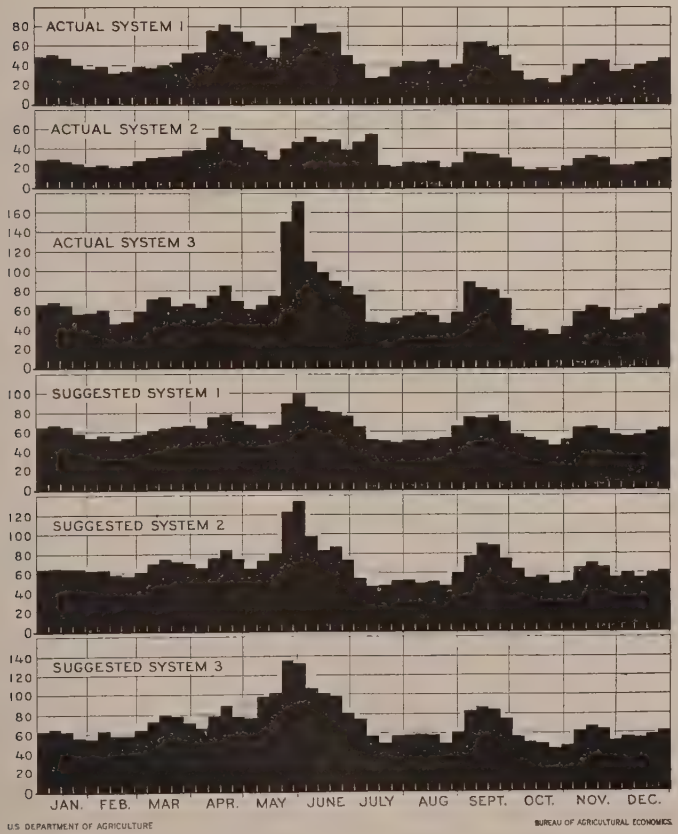
ACTUAL SYSTEM 1
ACTUAL SYSTEM 2
ACTUAL SYSTEM 3
SUGGESTED SYSTEM 1
SUGGESTED SYSTEM 2
SUGGESTED SYSTEM 3
JAN. FEB. MAR APR. MAY JUNE JULY AUG SEPT. OCT. NOV. DEC.
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

Fig. 1. Seasonal distribution of man labor for actual and suggested systems for 60-acre farms.

required for either suggested system, but more man labor is used with actual system 3 than is requied for either suggested system. If the work were carefully planned one man and two horses could do the work on any of the systems. The crops and livestock of the suggested systems are so combined that the man labor and horse work requirements are more evenly distributed

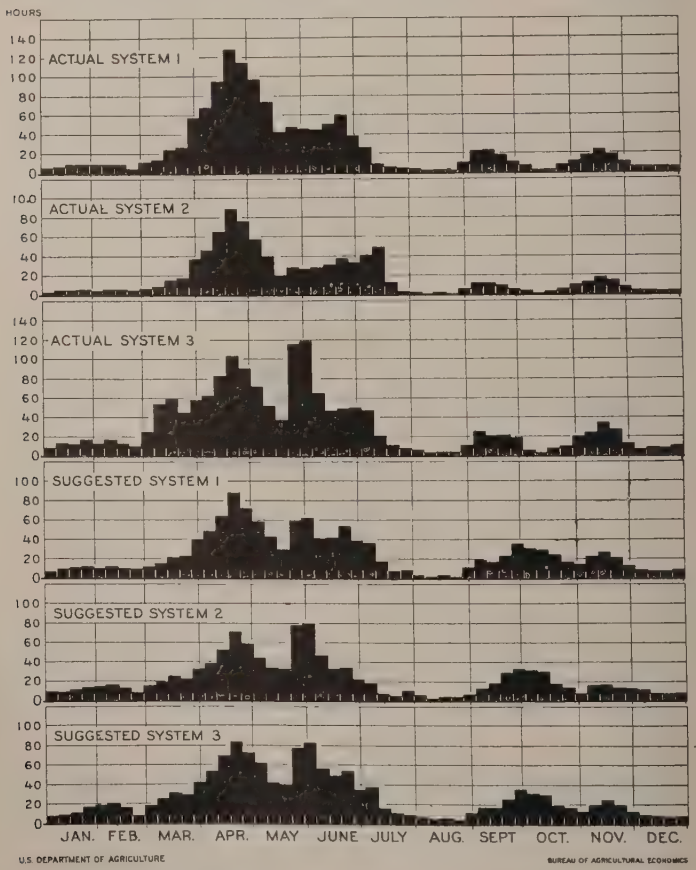


Fig. 2. Seasonal distribution of horse work for actual and suggested systems for 60-acre farms.

thruout the year than is the case with the actual systems. In the sections which follow some of the outstanding weaknesses of these actual systems are pointed out and the conditions to which the suggested systems are applicable are described.

### Actual System 1

The expected net return from this system is approximately $550. It provides but one important source of income, tobacco. A small amount of butterfat is sold and there are a few sales of poultry products and miscellaneous crops. The total cash income from all sources is less than $500 per year, a volume of sales much too small for a sixty-acre farm.

The feed crops have not been properly selected and there is not a good balance between them. The acreage of corn is too large and the acreage of legumes too small. Almost half of the tillable land is cultivated in corn and tobacco. With such a cropping system the productivity of the soil is soon exhausted. At present corn yields are less than twenty bushels per acre, cowpea hay yields only one-half ton per acre and tobacco yields just slightly above 700 pounds per acre.

The crops grown do not provide good rations for the livestock and it is necessary to purchase considerable quantities of protein feeds to supplement those grown. A larger acreage of legumes is needed. The pasture land is poorly utilized and during parts of the year the scanty growth is not enough to supply the livestock with feed. No late fall or early spring pasturage is available.

There is a surplus of work stock on the farm. With the use of mixed clovers for hay and pasture, and by doing some of the plowing in the fall, the field work could be managed so that two horses could furnish all the necessary horse work. A reduction in the number of work stock, along with the improvements in the cropping program, would make it possible to add two or three dairy cows and perhaps at the same time increase the number of poultry.

It probably would be advantageous to add to the cropping system another cash crop besides tobacco. Strawberries and

tobacco combine well together and generally a system of farming with a combination of these crops has advantages over a system which includes only one of them. On all the smaller farms of the Purchase such intensive crops as tobacco, strawberries, sweetpotatoes and tomatoes have a very important place.

### Actual System 2

The expected net return from this system is approximately $700. It provides two important sources of income, tobacco and strawberries, and one minor source, poultry.

The crops and livestock provide productive employment for only a part of the year. The cropping program is poorly arranged. Of the forty-three acres of tillable land on the farm thirty-four acres are in crops, and no perennial legumes are included in the rotation. This makes it difficult to maintain the fertility of the soil. Corn yields are only fifteen bushels per acre, hay yields are only about one-half ton per acre and tobacco yields only 650 pounds per acre. With the use of mixed clovers for hay and pasture and by keeping more of the land in pasture the productivity of the soil could be greatly improved and the yields of all crops materially increased. Such changes in the cropping system would make it possible to produce more feed and better feed for the livestock. If at the same time one of the present number of work stock could be eliminated sufficient feed would be made available to permit considerable expansion in both dairy cows and poultry. Since dairy cows consume relatively large quantities of hay and pasture to good advantage the greatest increase probably should be made in the dairy enterprise.

After substituting the cowpeas with mixed clover and with more livestock in the system the man labor and horse work requirements would be more evenly distributed. There would not be so much land to prepare and plant each year and the additional livestock would add greatly to the amount of productive work to be done during the winter.

### Actual System 3

The expected net return from this system is approximately $1025. It provides four important sources of income, tobacco, strawberries, dairy cows and hogs, and one minor source, poultry.

For this size of farm a more profitable combination of livestock probably could be obtained by reducing the number of hogs and increasing the number of poultry. To conduct either of these enterprises it requires relatively large quantities of corn and skim-milk, and since on a given area of land a larger volume of production can be obtained with poultry than with hogs it is usually advisable on most of the smaller farms to give greater emphasis to poultry.

The feed crops do not provide good rations for the livestock. During certain seasons of the year the pastures are not sufficient to provide for the needs of the livestock. Redtop and Japan clover furnish all the available pasturage. With the introduction of perennial clovers into the seeding mixture an abundance of pasturage could be made available thruout the growing season. This would make possible more economical feeding of the livestock and at the same time permit greater production to be obtained from them.

In spite of its faults this system is much superior to the majority of systems that are followed on the smaller farms of the area at present. For a sixty-acre farm the volume of production is good. The man labor and horse work requirements are fairly well distributed thruout the year, much better than in either actual system 1 or 2, since the livestock provide more productive employment during the winter season.

### Suggested System 1

The expected net return from this system is approximately $1200. It provides three important sources of income, tobacco, dairy cows and poultry, and two minor sources, wheat and hogs. The cropping program includes a 6-year rotation in which six 8-acre fields are used. One field is planted to corn. The following year 4 acres of corn, 3 acres of tobacco and 1 acre of soybean

hay are grown on this field. Wheat is seeded in the fall of the second year, followed by mixed clover and grass which is cut for hay one year and pastured 2 years. The field is planted to corn again the seventh year. Superphosphate is applied on corn at the rate of 400 pounds per acre the first year and 200 pounds per acre the second year. A complete fertilizer is used on tobacco at the rate of 350 pounds per acre and ground limestone on wheat at the rate of 2 tons per acre.

Enough livestock is kept to use the feed crops. The dairy cows are fed corn, mixed clover and soybean hay, corn stover, bran and shorts, and cottonseed meal. Whole milk is sold. Tankage is bought to balance the ration for hogs, and meat scrap and bran and shorts are bought to balance the ration for the poultry. In this and in other systems in which whole milk is sold and hogs or poultry kept the net returns and labor requirements are not greatly changed if butterfat is sold and the skim-milk used to balance the grain ration for the hogs and poultry.

The system is particularly adapted to farms so far away from the market that truck crops, strawberries or other fruit crops cannot be marketed economically. It would probably have advantages over suggested systems 2 and 3 for tenants who are not definitely located, or owner operators who are consistently successful in growing high-quality tobacco.

#### Suggested System 2

The expected net return from this system is approximately $1225. It provides four important sources of income, tobacco, strawberries, dairy cows and poultry. The cropping program includes two rotations. Four 10-acre fields are required for the major rotation. Corn is grown on one field, followed by rye, which is followed by mixed clovers and grass. The rye and mixed clovers and grass are pastured the second year, and the mixed clovers and grass are cut for hay the third year and pastured the fourth year. The field is planted to corn again the fifth year. Superphosphate is applied on corn at the rate

of 400 pounds per acre and ground limestone on rye at the rate of 2 tons per acre.

Four fields of 2 acres each are required for the minor rotation. Tobacco is grown on one field, followed by rye cover crop. The following spring one-half of this field is seeded to Japan clover and the other half planted to strawberries. Each of these crops remains three years. Japan clover is cut for hay one year and pastured the other two years.[27] Following the strawberries and Japan clover the field is planted to tobacco again the fifth year. The strawberries and japan clover are alternated in succeeding rounds of the rotation. A complete fertilizer is applied on tobacco at the rate of 500 pounds per acre and superphosphate on strawberries at the rate of 200 pounds per acre. The feeds for the livestock are similar to those indicated under suggested system 1.

This system is particularly adapted to farms within ten miles of a strawberry shipping point. For farms near a market for sweetpotatoes or other truck crops one of these crops may be substituted for strawberries, the system remaining in other respects as outlined.

#### Suggested System 3

The expected net return from this system is approximately $1450. It provides four important sources of income, tobacco, strawberries, dairy cows and poultry, and two minor sources, wheat and hogs. A smaller proportion of the income is obtained from dairy cows and a larger proportion from the two cash crops, tobacco and strawberries, than in either suggested system 1 or suggested system 2.

The cropping program includes two rotations. Six 6-acre fields are required for the major rotation. The crops in this rotation are corn, two years; wheat, one year; mixed clover hay, one year; and mixed clovers and grass pasture, two years. Superphosphate is applied on corn at the rate of 400 pounds per acre the first year, 200 pounds per acre the second year, and ground limestone on wheat at the rate of 2 tons per acre. Four

[27] A temporary fence would be required in this case and in similar cases referred to later in this bulletin.

3-acre fields are required for the minor rotation. Tobacco is grown on one field, followed by a rye cover crop. The following year one-half of this field is planted to strawberries and one-half is seeded to mixed clovers and grass. Each of these crops remains 3-years, the mixed clovers and grass being cut for hay one year and pastured two years. Both parts of the field are planted to tobacco again the fifth year, followed by strawberries and mixed clovers and grass. The strawberries and mixed clovers and grass are alternated in succeeding rounds of the rotation. A complete fertilizer is used on tobacco at the rate of 500 pounds per acre and superphosphate on strawberries at the rate of 200 pounds per acre. The feeds for the livestock are similar to those indicated under suggested systems 1 and 2.

This system is particularly adapted to farms near a strawberry market that are not especially suited to growing feed crops, or for farmers more especially fitted for growing strawberries or tobacco than for handling dairy cattle. On farms favorably located for growing sweetpotatoes or other truck crops, as mentioned under suggested system 2, one or more of these crops may be substituted for strawberries. Farmers with special aptitudes for growing strawberries and sweetpotatoes or other truck crops, and located favorably for marketing these crops, may find it advisable to displace all the tobacco with other cash crops.

#### Details of Suggested System 3

Of the systems outlined for 60-acre farms, suggested system 3 shows the largest net returns. A detailed budget for this system is shown in Table 5. The data shown in Tables 1, 2 and 3 have been used in the preparation of this budget. For example, the requirements and production for 3 acres of tobacco, as shown in Section A and B, were obtained by multiplying the different items for tobacco in Table 1 by three. The requirements and production for 5 dairy cows, as shown in Sections C and D, were obtained by multiplying the different items for dairy cows in Table 2 by five. In the budget shown feed combination I was used for dairy cows. The cost of expense items

**TABLE 5. Budget for suggested system 3 (60-acre farm—1 man, 2 horses)**
**Section A. Crops: Acreage, production and disposition.**

| Crop | Acres | Production | Farm Use | | Sales | |
|---|---|---|---|---|---|---|
| | | | Feed | Seed | Amount | Value |
| Tobacco | 3 | 2850 lbs. | | | 2850 lbs. | $285 |
| Strawberries (old) | 3 | 210 crs. | | | 210 crs. | 630 |
| Strawberries (new) | 1.5 | | | | | |
| Corn, grain | 12 | 420 bus. | 418.5 bus. | 1.5 bus. | | |
| Corn, stover | 6 | 13800 lbs. | 13800 lbs. | | | |
| Wheat | 6 | 84 bus. | | 7.5 bus. | 76.5 bus. | 99 |
| Mixed clover hay | 7.5 | 18750 lbs. | 18750 lbs. | | | |
| Clover and grass | 13.5 | Pasture | Pasture | | | |
| Rye (and clovers) | 1.5 | Pasture | Pasture | | | |
| Rye (cover crop) | 1.5 | | | | | |
| Orchard and truck | 2 | | | | | |
| Lots | 4 | | | | | |
| Woodland | 6 | | | | | |
| Total | | | | | | $1014 |

**TABLE 5. Budget for suggested system 3 (60-acre farm—1 man, 2 horses) (Continued)**
**Section B. Crops: Man labor, horse work and other requirements.**

| Crop | Man Hrs. | Horse Hrs. | Seed and Plants | | Fertilizer and Other Materials | | |
|---|---|---|---|---|---|---|---|
| | | | Amount | Value | Kind | Amount | Value |
| Tobacco | 750 | 270 | | | Fert. (5-9-4) | 1500 lbs. | $30 |
| | | | | | Canvas | 20 yds. | 1 |
| | | | | | Ars. of lead | 12 lbs. | 3 |
| | | | | | Bldg. exp. | | 15 |
| | | | | | Equipment | | 4 |
| Strawberries | 405 | 202 | 6750 plants | $24 | Superphosphate | 300 lbs. | 3 |
| | | | | | Straw | 3 T. | Farm |
| | | | | | Crates | 210 | 71 |
| | | | | | Contract picking | 210 crs. | 168 |
| | | | | | Grading & crating | 210 crs. | 42 |
| | | | | | Bldg. exp. | | 3 |
| | | | | | Equipment | | 9 |
| Corn | 402 | 492 | 1.5 bus. | Farm | Superphosphate | 3600 lbs. | 40 |
| | | | | | Twine | 12 lbs. | 2 |
| | | | | | Equipment | | 9 |
| Wheat | 90 | 132 | 7.5 bus. | Farm | Contract threshing | 84 bus. | 10 |
| | | | | | Twine | 12 lbs. | 2 |
| | | | | | Equipment | | 4 |
| Mixed clover hay | 82 | 90 | 22 lbs. Red cl. | 7 | | | |
| | | | 8 lbs. Alsike | 2 | | | |
| | | | 22 lbs. Alfalfa | 5 | Limestone | 15 T. | 49 |
| | | | 38 lbs. Orch'd grass | 7 | Equipment | | 4 |
| Rye (seeding) | 12 | 30 | 4.5 bus. | 6 | Equipment | | 1 |
| Total | 1741 | 1216 | | $51 | Fertilizer and materials | | $421 |
| | | | | | Building expense | | 18 |
| | | | | | Equipment expense | | 31 |

**TABLE 5. Budget for suggested system 3 (60-acre farm—1 man, 2 horses) (Continued)**
**Section C. Livestock: Number, and man labor, horse work, feed and material requirements.**

| Livestock | Number | Man Hrs. | Horse Hrs. | Home Grown Feeds | | Purchased Feed and Other Expenses | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Kind | Amount | Kind | Amount | Value |
| Dairy cows | 5 | 750 | 50 | Corn<br>Mixed hay<br>Corn stover | 80 lbs.<br>12500 lbs.<br>5000 lbs. | Bran and shorts<br>Cottonseed meal<br>Bldg. exp.<br>Equip. exp.<br>Miscellaneous | 500 lbs.<br>1500 lbs. | $9<br>33<br>15<br>8<br>12 |
| Veals | 2 | 10 | 2 | Whole milk | 960 lbs. | | | |
| Dairy calves | 2 | 20 | 2 | Mixed hay<br>Skim-milk<br>Whole milk | 400 lbs.<br>2400 lbs.<br>100 lbs. | Bldg. & miscl. | | 1 |
| Dairy heifers | 2 | 20 | 2 | Corn<br>Mixed hay<br>Corn stover | 4 bus.<br>1100 lbs.<br>1800 lbs. | Bran and shorts<br>Bldg. & miscl. | 200 lbs. | 4<br>1 |
| Sow and pigs | 1 | 80 | 16 | Corn<br>Skim-milk | 104 bus.<br>4400 lbs. | Equip. exp.<br>Miscellaneous | | 2<br>2 |
| Poultry | 125 | 500 | 38 | Corn<br>Skim-milk | 146 bus.<br>10000 lbs. | Bran and shorts<br>Meat scrap<br>Baby chick feed<br>Oyster shell<br>Bldg. exp.<br>Miscellaneous | 1875 lbs.<br>125 lbs.<br>250 lbs.<br>500 lbs. | 34<br>6<br>13<br>5<br>25<br>1 |
| Work stock | 2 | 90 | 10 | Corn<br>Mixed hay<br>Corn stover | 80 bus.<br>5500 lbs.<br>3000 lbs. | Bldg. exp.<br>Equip. exp.<br>Depreciation<br>Miscellaneous | | 7<br>4<br>14<br>4 |
| Total | | 1470 | 120 | Corn<br>Whole milk<br>Skim-milk<br>Mixed hay<br>Corn stover | 414 bus.<br>1060 lbs.<br>16800 lbs.<br>19500 lbs.<br>9800 lbs. | Feeds<br>Building expense<br>Equipment expense<br>Work stock depreciation<br>Miscellaneous | | $104<br>48<br>14<br>14<br>20 |

and value of production are obtained by multiplying the quantities obtained, as indicated above, by the prices shown in Table 3.

The crop rotations used in suggested system 3 are shown in Figures 3 and 4. The seasonal distribution of man labor and horse work for the different crop and livestock enterprises are shown in Figures 5 and 6.

**TABLE 5. Budget for suggested system 3 (60-acre farm—1 man, 2 horses) (Continued)**

**Section D. Livestock: Production and disposition of products.**

| Kind of Livestock and Product | Production | Disposal | | | | |
|---|---|---|---|---|---|---|
| | | Fed to Livestock | Used in Home | | Sales | |
| | | | Amount | Value | Amount | Value |
| Dairy cows | | | (365 gal.) | | | |
| Whole milk | 25000 lbs. | 1060 lbs. | 3140 lbs. | $66 | 936 lbs.[1] | $356 |
| Veals | 280 lbs. | | | | 280 lbs. | 22 |
| Cull cows | 2 cows | | | | 2 cows | 48 |
| Pork | 1600 lbs. | | 500 lbs. | 44 | 1100 lbs. | 96 |
| Poultry | | | | | | |
| Eggs | 1125 doz. | 62 doz.[2] | 150 doz. | 38 | 913 doz. | 228 |
| Fryers | 500 lbs. | | 100 lbs. | 26 | 400 lbs. | 104 |
| Hens | 500 lbs. | | | | 500 lbs. | 90 |
| Total | | | | $174 | | $944 |

[1] Butterfat, sold in cream. [2] Eggs used for setting.

**TABLE 5. Budget for suggested system 3 (60-acre farm—1 man, 2 horses) (Continued)**

**Section E. Summary of receipts and expenses.**

| Incomes | | Expenses | |
|---|---|---|---|
| Crops (Section A). | $1014 | Crops (Section B) | |
| Livestock and livestock products (Section D) | 944 | Seeds and plants | $51 |
| | | Fertilizer and materials | 421 |
| Livestock products used in home (Section D) | 174 | Building expense | 18 |
| | | Equipment expense | 31 |
| Garden and truck | 150 | Livestock (Section C) | |
| Total | $2282 | Feeds purchased | 104 |
| | | Building expense | 48 |
| | | Equipment expense | 14 |
| | | Work stock depreciation | 14 |
| | | Miscellaneous | 20 |
| Net return $1450 | | General Farm | |
| | | Fence expense | 36 |
| | | Automobile expense | 75 |
| | | Total | $832 |

| | Field 1<br>6 acres | Field 2<br>6 acres | Field 3<br>6 acres | Field 4<br>6 acres | Field 5<br>6 acres | Field 6<br>6 acres |
|---|---|---|---|---|---|---|
| 1930 | Corn | Mixed clover and grass pasture | Mixed clover and grass pasture | Mixed clover hay | Wheat (Mixed clover) | Corn (Wheat) |
| 1931 | Corn (Wheat) | Corn | Mixed clover and grass pasture | Mixed clover and grass pasture | Mixed clover hay | Wheat (Mixed clover) |
| 1932 | Wheat (Mixed clover) | Corn (Wheat) | Corn | Mixed clover and grass pasture | Mixed clover and grass pasture | Mixed clover hay |
| 1933 | Mixed clover hay | Wheat (Mixed clover) | Corn (Wheat) | Corn | Mixed clover and grass pasture | Mixed clover and grass pasture |
| 1934 | Mixed clover and grass pasture | Mixed clover hay | Wheat (Mixed clover) | Corn (Wheat) | Corn | Mixed clover and grass pasture |
| 1935 | Mixed clover and grass pasture | Mixed clover and grass pasture | Mixed clover hay | Wheat (Mixed clover) | Corn (Wheat) | Corn |
| 1936 | Corn | Mixed clover and grass pasture | Mixed clover and grass pasture | Mixed clover hay | Wheat (Mixed clover) | Corn (Wheat) |

Fig. 3. Major crop rotation for suggested system 3.

| | Field 7<br>3 acres | Field 8<br>3 acres | Field 9<br>3 acres | Field 10<br>3 acres |
|---|---|---|---|---|
| 1930 | Tobacco (Rye) | Clover and grass / Straw-berries | Mixed clover hay / Straw-berries | Rye and mixed clovers / Straw-berries |
| 1931 | Straw-berries / Rye and mixed clovers | Tobacco (Rye) | Clover and grass / Straw-berries | Mixed clover hay / Straw-berries |
| 1932 | Straw-berries / Mixed clover hay | Straw-berries / Rye and mixed clovers | Tobacco (Rye) | Clover and grass / Straw-berries |
| 1933 | Straw-berries / Clover and grass | Straw-berries / Mixed clover hay | Straw-berries / Rye and mixed clovers | Tobacco (Rye) |
| 1934 | Tobacco (Rye) | Straw-berries / Clover and grass | Straw-berries / Mixed clover hay | Straw-berries / Rye and mixed clovers |
| 1935 | Rye and mixed clovers / Straw-berries | Tobacco (Rye) | Straw-berries / Clover and grass | Straw-berries / Mixed clover hay |
| 1936 | Mixed clover hay / Straw-berries | Rye and mixed clovers / Straw-berries | Tobacco (Rye) | Straw-berries / Clover and grass |
| 1937 | Clover and grass / Straw-berries | Mixed clover hay / Straw-berries | Rye and mixed clovers / Straw-berries | Tobacco (Rye) |
| 1938 | Tobacco (Rye) | Clover and grass / Straw-berries | Mixed clover hay / Straw-berries | Rye and mixd clovers / Straw-berries |
| 1939 | Straw-berries / Rye and mixed clovers | Tobacco (Rye) | Clover and grass / Straw-berries | Mixed clover hay / Straw-berries |

**Fig. 4. Minor crop rotation for suggested system 3.**

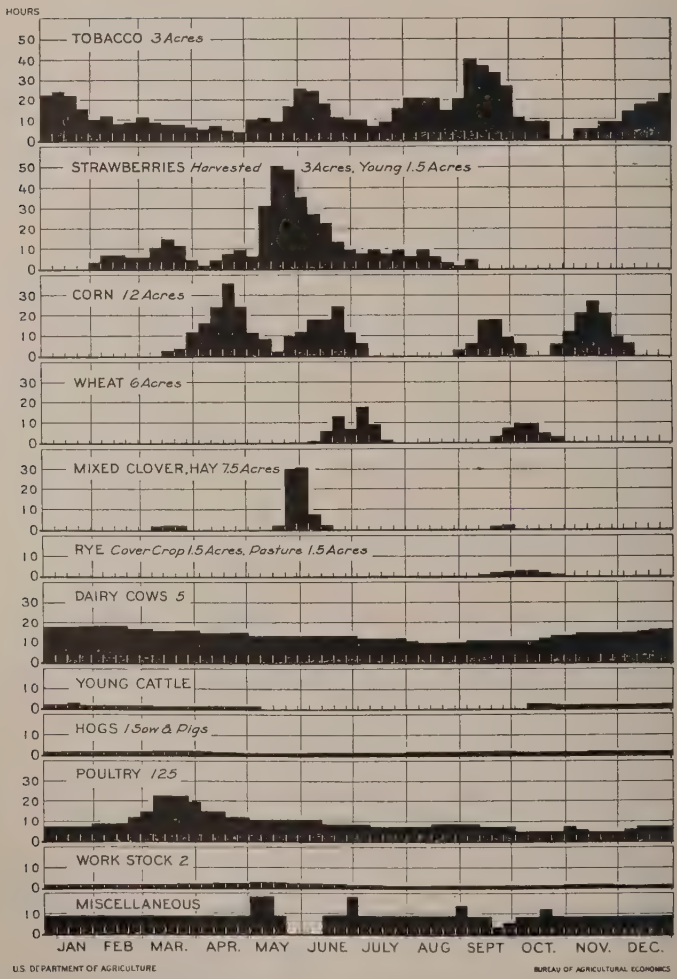
HOURS
TOBACCO 3 Acres
STRAWBERRIES Harvested 3 Acres, Young 1.5 Acres
CORN 12 Acres
WHEAT 6 Acres
MIXED CLOVER, HAY 7.5 Acres
RYE Cover Crop 1.5 Acres, Pasture 1.5 Acres
DAIRY COWS 5
YOUNG CATTLE
HOGS 1 Sow & Pigs
POULTRY 125
WORK STOCK 2
MISCELLANEOUS
JAN FEB MAR. APR. MAY JUNE JULY AUG SEPT OCT. NOV. DEC.
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

Fig. 5. Seasonal distribution of man labor by crop and livestock enterprises for suggested system 3.

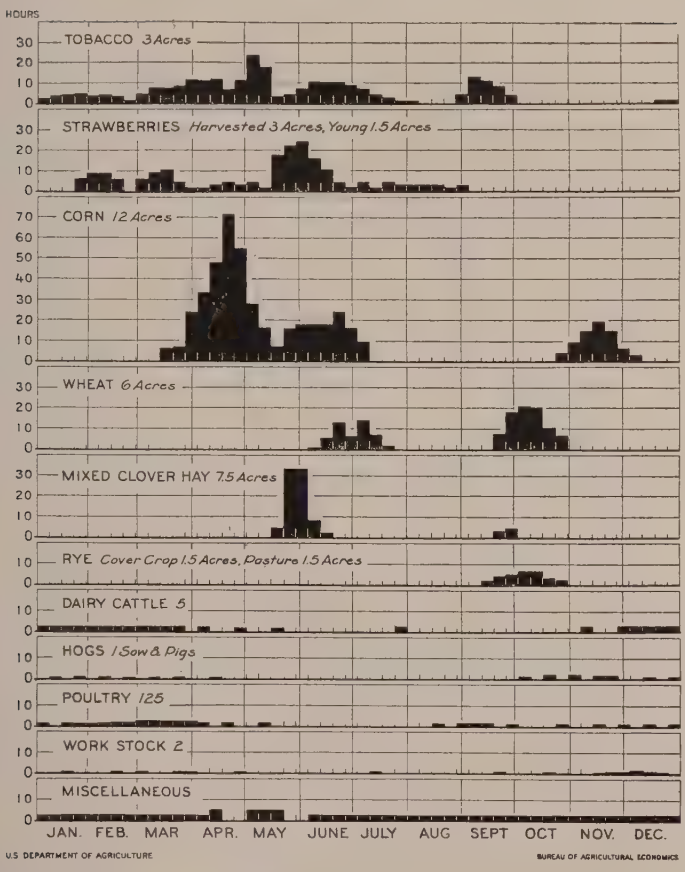
HOURS
TOBACCO 3 Acres
STRAWBERRIES Harvested 3 Acres, Young 1.5 Acres
CORN 12 Acres
WHEAT 6 Acres
MIXED CLOVER HAY 7.5 Acres
RYE Cover Crop 1.5 Acres, Pasture 1.5 Acres
DAIRY CATTLE 5
HOGS 1 Sow & Pigs
POULTRY 125
WORK STOCK 2
MISCELLANEOUS
JAN. FEB. MAR APR. MAY JUNE JULY AUG SEPT OCT NOV. DEC.
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

Fig. 6. Seasonal distribution of horse work by crop and livestock enterprises for suggested system 3.

## SYSTEMS FOR 80-ACRE FARMS

The acres of crops, numbers of livestock, hours of man labor and horse work and expected returns for systems actually followed on two farms of approximately 80 acres each and two suggested systems for 80-acre farms are shown in Table 6. Each of the actual systems is typical of those being followed on a large number of 80-acre farms in the section.

The expected returns for these systems are worked out in a manner similar to that described for 60-acre farms. Under

TABLE 6. Summary of two actual and two suggested systems[1] (80-acre farms)

| | Actual System 4 | Actual System 5 | Suggested System 4 | Suggested System 5 |
|---|---|---|---|---|
| Acres | 80 | 85 | 80 | 80 |
| Value of farm, dolls.[2] | 3000 | 3825 | 3500 | 4500 |
| Livestock, equipment and feed, dolls. | 1225 | 1408 | 2100 | 1700 |
| Number of men | 1.5 | 1 | 1[3] | 1[3] |
| Number of work stock | 5 | 3 | 3 | 3 |
| Acres in crops: | | | | |
| Corn for grain | 25 | 16.5 | 16 | 16 |
| Cowpea and soybean hay | — | 5 | 4 | — |
| Mixed clover hay | 1.5 | — | 11 | 8 |
| Grass hay | 5.5 | — | — | — |
| Japan clover hay | — | 5 | — | 4 |
| Sorghum | — | 3 | — | — |
| Wheat | — | — | 11 | 3 |
| Rye, cover crop and pasture | — | — | — | 2 |
| Tobacco | 4 | 2.5 | 2 | 4 |
| Strawberries (harvested) | — | — | — | 4 |
| Strawberries (young) | — | 1 | — | 2 |
| Other truck | .5 | 1 | 2 | 2 |
| Pasture | 30 | 20 | 22 | 18 |
| Hours man labor on crops | 1671 | 1572 | 1363 | 2332 |
| Hours horse work on crops | 1416 | 1382 | 1356 | 1614 |
| Number of livestock: | | | | |
| Dairy cows | 3 | 5 | 10 | 6 |
| Bull | — | 1 | — | — |
| Dairy heifers (1 to 2 years) | 2 | 4 | 3 | 2 |
| Dairy calves (under 1 year) | 3 | 5 | 3 | 2 |
| Veals | — | — | 6 | 3 |
| Sheep | — | 6 | — | — |
| Boar | — | 1 | — | — |
| Sows | 1 | 2 | 1 | 2 |
| Other hogs | 15 | 28 | 8 | 16 |
| Poultry | 70 | 100 | 135 | 100 |
| Hours man labor on livestock | 1140 | 1636 | 2345 | 1645 |
| Hours horse work on livestock | 111 | 158 | 183 | 143 |
| Farm receipts, dolls. | 979 | 1520 | 1962 | 2407 |
| Products used in home, dolls. | 304 | 268 | 324 | 324 |
| Farm expenses, dolls. | 372 | 465 | 784 | 989 |
| Net returns: | | | | |
| Actual, dolls. | 911 | 1323 | — | — |
| Expected, dolls. | 1095 | 1274 | 1552 | 1742 |

[1] Detailed budgets for suggested systems 4 and 5 are shown in the appendix pages 105 to 114. [2] Excluding the value of the residence. [3] An additional man will be required for about 4 months during the crop growing season.

usual conditions in the section the chances appear about equal for a net return of approximately $1100 from systems similar to actual system 4, $1275 from systems similar to actual system

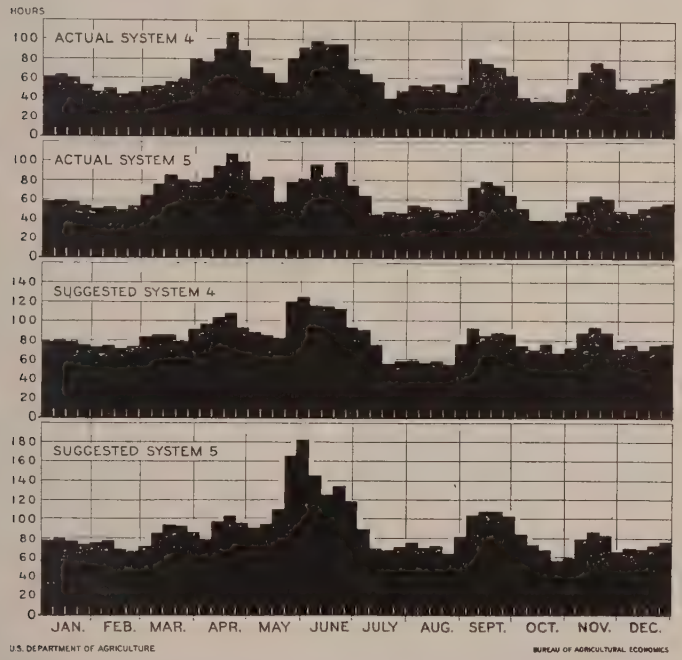
HOURS
ACTUAL SYSTEM 4
ACTUAL SYSTEM 5
SUGGESTED SYSTEM 4
SUGGESTED SYSTEM 5
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

**Fig. 7.** Seasonal distribution of man labor for actual and suggested systems for 80-acre farms.

5, $1550 from systems similar to suggested system 4 and $1750 from systems similar to suggested system 5 (See Table 6). The seasonal distribution of man labor and horse work for each of these systems is shown in figures 7 and 8. One man, with an additional man during the crop-growing season, and five horses do the work on actual system 4, and one man and 3 horses do the work on actual system 5. One man and 3 horses are included in each suggested system.

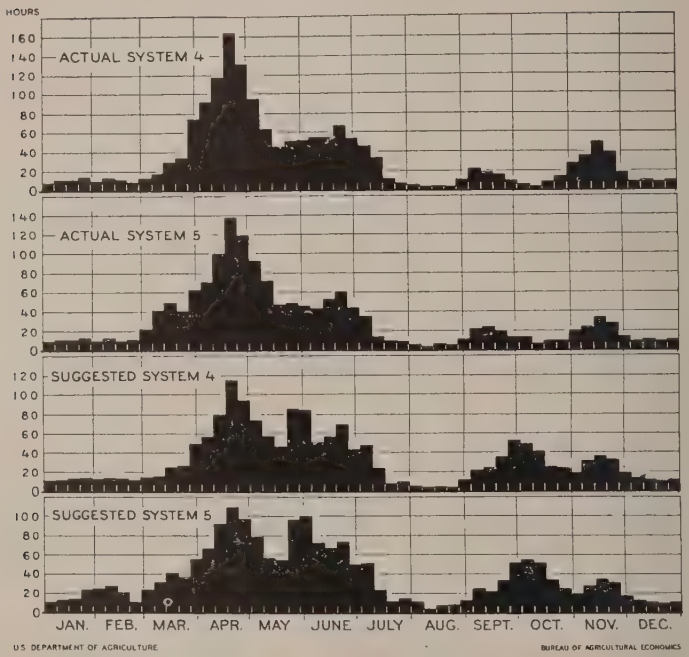
HOURS
ACTUAL SYSTEM 4
ACTUAL SYSTEM 5
SUGGESTED SYSTEM 4
SUGGESTED SYSTEM 5
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

Fig. 8. Seasonal distribution of horse work for actual and suggested systems for 80-acre farms.

### Actual System 4

The expected net return from this system is approximately $1100. It provides two important sources of income, tobacco and dairy cows, and two minor sources, hogs and poultry.

An outstanding weakness in the system is the improper selection of feed crops and the lack of balance between them. Since all the legume hay is obtained from cowpeas and soybeans, and since a large acreage of corn is grown, it is necessary to prepare and plant about one half of the tillable land each year. This results in unusually heavy man labor and horse work requirements in the spring. It also makes it difficult to keep up the fertility of the soil. With the use of mixed clovers for hay and pasture the labor requirements would be much better dis-

tributed, and soil fertility could be maintained much more economically.

The introduction of mixed clovers into the rotation would make it possible to grow more feed and better feed for the livestock. If, at the same time, the present surplus of work stock could be eliminated the numbers of both dairy cows and poultry could be increased, and the income from the system made considerably greater.

Since this farm is only about five miles from a strawberry shipping point it is quite possible that a small acreage of this crop could be added without interfering seriously with the other enterprises. Systems of farming with strawberries and tobacco generally have advantages over systems with only one of these crops.

#### Actual System 5

The expected net return from this system is approximately $1275. Most of the income is derived from four sources: Dairy cows, hogs, poultry and tobacco. Two minor sources of income, sheep and strawberries, are also included.

For a rolling farm, such as this, the present system could be improved by reducing the acreage of corn and increasing the acreages of legume hay and pasture. This would make it necessary to reduce the number of hogs, but at the same time it would permit expansion in the number of dairy cows or sheep, or both. At present about forty dollars per cow is spent for protein concentrates and legume hay. It would be advantageous to change the kind of pasturage and increase the acreage. Except for a small amount of rye, which is used for early spring grazing, redtop and Japan clover provide all of the available pasturage on the farm. Much better results could be obtained by using mixed clovers and grasses and preparing for pasture at the time the land is seeded for hay.

With the introduction of more legumes into the rotation, and by keeping more of the land in grass, it would be possible to maintain the fertility of the soil much more economically. Crop yields could be increased considerably above those that

are being obtained at present, and at the same time less commercial fertilizers would need to be bought.

The enterprises in this system are combined in such a way that good use is made of most non-marketable by-products. The man labor and horse work requirements are well distributed. There is usually something to keep the men profitably employed, and at few times during the year are there serious conflicts in the demands of two or more enterprises for labor.

### Suggested System 4

The expected net return from this system is approximately $1550. It provides three important sources of income, tobacco, dairy cows and poultry, and two minor sources of income, wheat and hogs. The cropping program requires six 11-acre fields. One field is planted to corn. The following year it is planted to 2 acres of tobacco, 5 acres of corn and 4 acres of soybean hay. Wheat is sown in the fall of the second year, followed by mixed clover and grass, which is cut for hay one year and pastured two years. The field is planted to corn again the seventh year. Superphosphate is applied on corn at the rate of 400 pounds per acre the first year and 200 pounds per acre the second year. A complete fertilizer is applied on tobacco at the rate of 350 pounds per acre and ground limestone on wheat at the rate of 2 tons per acre. The dairy cows are fed corn, mixed clover hay, corn stover, bran and shorts, and cottonseed meal. Whole milk is sold. Tankage is bought to balance the ration for the hogs, and meat scrap and bran and shorts are bought to balance the ration for the poultry.

This system is particularly adapted to farms located so far from the market that strawberries and other fruit crops cannot be marketed economically. Tomatoes may be substituted for the tobacco in this system, where markets are available. If 4 acres of tomatoes were substituted for 4 acres of tobacco the change would reduce the man labor requirements about 400 hours, increase the horse labor requirements about 120 hours, and reduce the net returns about $50.

### Suggested System 5

The expected net return from this system is approximately $1750. It provides four important sources of income, tobacco, strawberries, dairy cows and poultry, two minor sources, wheat and hogs.

The cropping program includes two rotations. The major rotation requires six 8-acre fields. The crops in this rotation are corn, two years; wheat, one year; mixed clover hay, one year; and mixed clover and grass pasture, two years. Superphosphate is applied on corn at the rate of 400 pounds per acre the first year, 200 pounds per acre the second year, and ground limestone on wheat at the rate of 2 tons per acre. The other rotation requires four 4-acre fields. Tobacco is grown on one field, followed by a cover crop of rye. The following year half of this field is planted to strawberries and half to Japan clover and grass. The Japan clover is pastured one year and cut for hay two years. Each of these crops remains three years. The entire field is planted to tobacco again the fifth year. The strawberries and Japan clover are alternated in succeeding rounds of the rotation. A complete fertilizer is used on tobacco at the rate of 500 pounds per acre and superphosphate on strawberries at the rate of 200 pounds per acre. The feeds for the livestock are similar to those indicated under suggested system 4.

Tobacco precedes strawberries in the rotation. This makes it possible to keep the ground clean with the least possible labor, and tends to prevent trouble with grubs when the plants are transplanted. This system is adapted to farms located within ten miles of a strawberry shipping point. In cases in which the conditions on the farm and markets make the growing of sweet-potatoes or dewberries or other fruit crops advisable one of these crops may be substituted for strawberries or tobacco.

## SYSTEMS FOR 100-ACRE FARMS

The acres of crops, numbers of livestock and expected returns for two systems actually followed on farms of approximately 100 acres each and two suggested systems for 100-acre farms are shown in Table 7. The seasonal distribution of man

labor and horse work for each of these systems is shown in Figures 9 and 10. The work on actual system 6 is done by one man and 3 horses. The work on actual system 7 is done by 2

TABLE 7. Summary of two actual systems and two suggested systems[1] (100-acre farms)

| | Actual System 6 | Actual System 7 | Suggested System 6 | Suggested System 7 |
|---|---|---|---|---|
| Acres | 102 | 105 | 100 | 100 |
| Value of farm, dolls.[2] | 5290 | 3750 | 4500 | 5500 |
| Livestock, equipment and feed, dolls. | 1500 | 1015 | 2700 | 2100 |
| Number of men | 1 | 2 | 2 | 2 |
| Number of work stock | 3 | 4 | 4 | 4 |
| Acres in crops: | | | | |
| Corn for grain | 14¾ | 25 | 20 | 16 |
| Cowpeas and soybeans | 4 | — | 2 | — |
| Mixed clover hay | — | — | 14 | 16 |
| Japan clover hay | 10 | 16[3] | — | — |
| Wheat | 16 | — | 14 | 16 |
| Rye, cover crop and pasture | — | — | — | 2.5 |
| Tobacco | 6.5 | 4 | 6 | 5 |
| Strawberries (harvested) | — | — | — | 5 |
| Strawberries (young) | — | — | — | 2.5 |
| Other truck | .5 | 2 | 2.5 | 2.5 |
| Pasture | 30 | 36 | 28 | 23.5 |
| Hours man labor on crops | 2098 | 1852 | 2522 | 3003 |
| Hours horse work on crops | 1705 | 1623 | 1914 | 2016 |
| Number of livestock: | | | | |
| Dairy cows | 5 | 3 | 10 | 10 |
| Dairy heifers (1 to 2 years) | 1 | 1 | 3 | 3 |
| Dairy calves (under 1 year) | 2 | 2 | 3 | 3 |
| Veals | 1 | 1 | 6 | 6 |
| Sows | 2 | 1 | 2 | 1 |
| Other hogs | 17 | 7 | 16 | 8 |
| Poultry | 20 | 104 | 140 | 100 |
| Hours man labor on livestock | 1412 | 1141 | 2490 | 2250 |
| Hours horse work on livestock | 115 | 99 | 206 | 178 |
| Farm receipts, dolls. | 2168 | 1129 | 2488 | 3207 |
| Products used in household, dolls. | 254 | 383 | 460 | 460 |
| Farm expenses, dolls. | 850 | 273 | 891 | 1391 |
| Net returns: | | | | |
| Actual, dolls. | 1572 | 1239 | — | — |
| Expected, dolls. | 1287 | 1025 | 2057 | 2276 |

[1] Detailed budgets for suggested systems 6 and 7 are shown in the appendix pages 115 to 124. [2] Excluding the value of the residence. [3] Includes 4 acres oat hay.

men and 4 horses. Suggested systems 6 and 7 are for 2 men and 4 horses.

### Actual System 6

The expected net return from this system is approximately $1300. It provides three important sources of income, tobacco, dairy cows and hogs, and two minor sources, wheat and poultry.

One of the most serious weaknesses of this system is that the feed crops have not been properly selected. Since soybeans are used to provide most of the legume hay, and since a considerable amount of corn is grown, it is necessary to prepare and plant a large acreage of land each year. This results in heavy man labor and horse work requirements in May and June. Owing to the conflict between soybean harvesting and the housing and curing season for tobacco another rush period comes in the fall. By

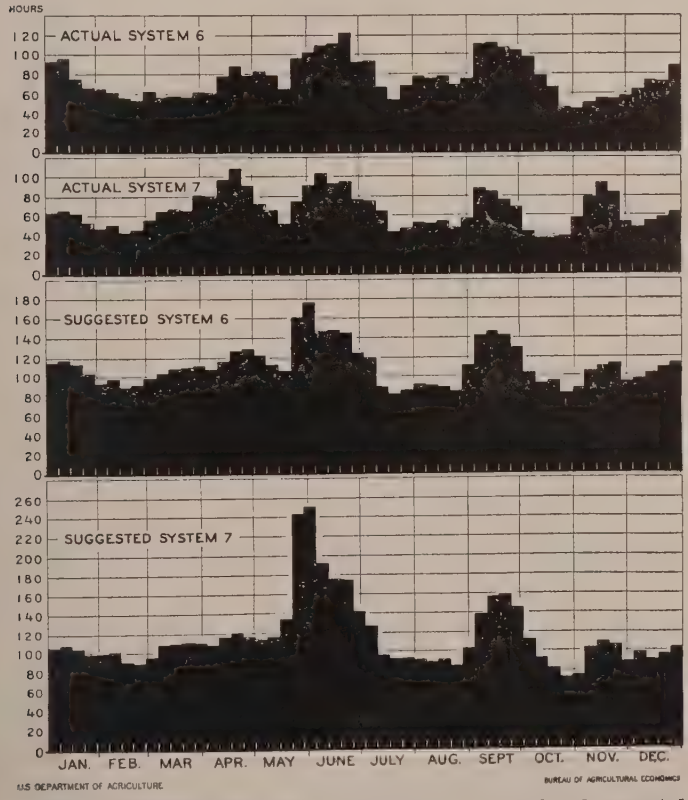


**Fig. 9.** Seasonal distribution of man labor for actual and suggested systems for 100-acre farms.

substituting mixed clover hay for some of the soybean hay most of this difficulty could be overcome.

To supply the livestock with properly balanced rations a larger acreage of legume hay is needed. With the present system it is necessary to purchase considerable quantities of high-protein feeds. By using a part of the acreage that is now planted to corn for the production of mixed clover hay a better combination of feed crops could be made. This would make it necessary to reduce the number of hogs, but at the same time it would permit more dairy cows to be kept. The poultry enterprise could probably be increased to good advantage also. The

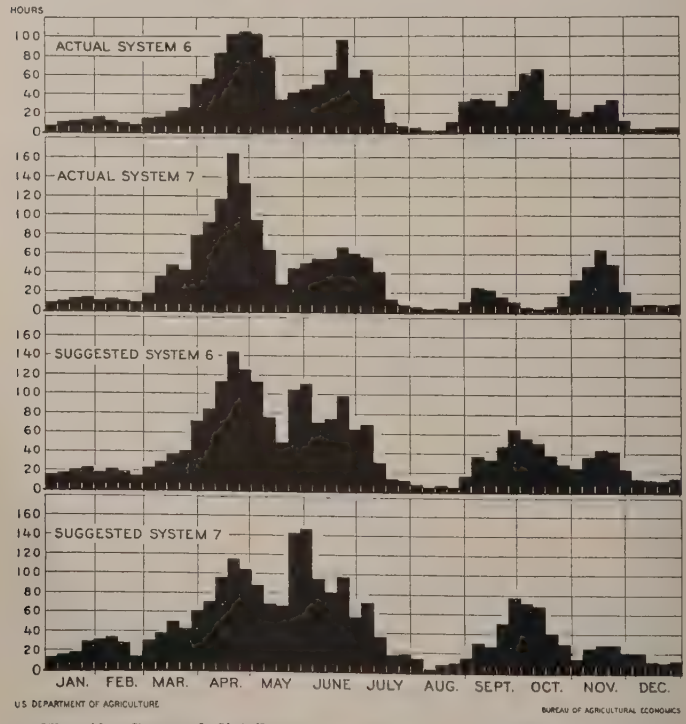
HOURS
ACTUAL SYSTEM 6
ACTUAL SYSTEM 7
SUGGESTED SYSTEM 6
SUGGESTED SYSTEM 7
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

**Fig. 10.** Seasonal distribution of horse work for actual and suggested systems for 100-acre farms.

crop rotation resulting from such changes would make it easier and cheaper to maintain the fertility of the soil, and the returns would be considerably larger than those that are being realized at present.

This system is superior to the majority of systems that are now being followed in the Purchase. It permits efficient use to be made of all available man labor and horse work, and the crop yields show that it provides an adequate program for maintaining the fertility of the soil. For a one-man farm the returns are far from discouraging.

### Actual System 7

The expected net return from this system is approximately $1025. There are two important sources of income, tobacco and poultry, and two minor sources, dairy cows and hogs.

An outstanding weakness of the system is the poor selection of feed crops and the lack of balance between feed crops and livestock. The rations provided by the cropping system are not properly balanced. More corn is produced than is needed to supply the feeding requirements, and no legumes are grown. More than twenty-five dollars per cow is spent each year for protein concentrates. There are not enough livestock kept to utilize the available pasturage.

Since no legumes are provided in the cropping program it is difficult to maintain the fertility of the soil. With the introduction of perennial clovers into the rotation good crop yields could be produced much more economically. In addition more livestock could be kept.

The crops and livestock do not provide profitable employment for the men and teams. As it is now operated two head of work stock probably could furnish all the horse work needed with this system. By the proper selection of feed crops and improvements in the balance between enterprises the system could be made to furnish productive work for most of the available man labor and horse work and the volume of business from the entire farm greatly expanded. The returns from such a system

would be much larger than those that are being realized at present.

### Suggested System 6

The expected net return from this system is approximately $2050. It provides three important sources of income, toabcco, dairy cows and poultry, and two minor sources, wheat and hogs.

The cropping program requires six 14-acre fields. One field is planted to corn. The following year 6 acres of corn, 6 acres of tobacco and 2 acres of soybean hay are grown in this field. Wheat is seeded in the fall of the second year and mixed clover and grass are sown the following spring. The mixed clover and grass is harvested for hay one year and pastured two years. The field is planted to corn again the seventh year. Superphosphate is applied on corn at the rate of 400 pounds per acre the first year, 200 pounds per acre the second year, and ground limestone on wheat at the rate of 2 tons per acre. A complete fertilizer is applied on tobacco at the rate of 350 pounds per acre. The dairy cows are fed corn, mixed clover and soybean hay, corn stover, bran and shorts, and cottonseed meal. Whole milk is sold. Tankage is bought to balance the ration for the hogs, and meat scrap and bran and shorts are bought to balance the ration for the poultry.

Like suggested systems 1 and 4, this system is particularly adapted to those farms located so far from the market that perishable fruits and vegetables cannot be marketed to advantage. It is also well adapted to farms that are particularly suited to growing tobacco of good quality, and may be used with slight modifications by many farmers who have been depending upon tobacco as the principal source of income. While the system as outlined provides for selling whole milk, if there is a satisfactory market cream may be sold about as advantageously, provided enough poultry and hogs are kept to utilize the skim-milk.

### Suggested System 7

The expected net return from this system is approximately $2275. It provides three important sources of income, tobacco,

strawberries and dairy cows, and three minor sources, wheat, hogs and poultry.

The cropping program includes two rotations. The major rotation requires four 16-acre fields. The crops for this rotation are corn, one year; wheat, one year; mixed clover hay, one year; mixed clover and grass pasture, one year. Superphosphate is applied on corn at the rate of 400 pounds per acre and ground limestone on wheat at the rate of 2 tons per acre. The minor rotation requires four 5-acre fields. Tobacco is planted in one field, one-half of which is followed by strawberries and one-half by a mixture of clover and grasses for pasture. Each of these crops remains three years. The field is planted to tobacco again the fifth year. The strawberries and pasture mixture are alternated in succeeding rounds of the rotation. A complete fertilizer is applied on tobacco at the rate of 500 pounds per acre and superphosphate on strawberries at the rate of 200 pounds per acre. The feeds for the livestock are similar to those indicated under suggested system 6.

Such a system is particularly adapted to upland farms located near a market for strawberries, and having land and barns suitable for growing tobacco of good quality. Tomatoes or sweetpotatoes could be substituted for part of the tobacco in this system without interfering with the rotation. In either case slightly less man labor would be required.

### SYSTEMS FOR 150-ACRE FARMS

The acres of crops, numbers of livestock, hours of man labor and horse work and expected returns for two systems actually followed on farms of approximately 150 acres each and two suggested systems for 150-acre farms are shown in Table 8. The seasonal distribution of man labor and horse work for each of these systems is shown in Figures 11 and 12. The suggested systems are for 2 men and 4 horses. More than 2 men were used with each actual system and 6 horses are kept on each farm. However, 2 men and 4 horses could have handled a larger business than was handled on either if the crops and livestock had been planned more carefully.

**TABLE 8. Summary of two actral systems and two suggested systems[1] (150-acre farms)**

| | Actual System 8 | Actual System 9 | Suggested System 8 | Suggested System 9 |
|---|---|---|---|---|
| Acres | 152 | 150 | 150 | 150 |
| Value of farm, dolls.[2] | 3300 | 4500 | 6000 | 8000 |
| Livestock, equipment and feed, dolls. | 1088 | 1299 | 3200 | 3000 |
| Number of men | 3.5 | 2.5 | 2 | 2[3] |
| Number of work stock | 6 | 6 | 4 | 4 |
| Acres in crops: | | | | |
| Corn for grain | 35 | 35 | 21 | 22 |
| Mixed clover hay | — | — | 26 | 22 |
| Redtop hay | 28 | — | — | — |
| Japan clover hay | 5 | — | — | — |
| Sorghum | .5 | — | — | — |
| Wheat | — | — | 26 | 24.5 |
| Tobacco | 10 | 10 | 5 | — |
| Strawberries (harvested) | — | — | — | 5 |
| Strawberries (young) | — | — | — | 2.5 |
| Tomatoes | — | — | — | 5 |
| Other truck | 1 | .5 | 3 | 3 |
| Pasture | 29 | 51.5 | 52 | 49 |
| Hours man labor on crops | 3540 | 3320 | 2766 | 2978 |
| Hours horse work on crops | 2490 | 2260 | 2174 | 2646 |
| Number of livestock: | | | | |
| Dairy cows | 2 | 3 | 12 | 15 |
| Dairy heifers (1 to 2 years) | 1 | — | 3 | 4 |
| Dairy calves (under 1 year) | — | — | 3 | 4 |
| Veals | 2 | 3 | 8 | 10 |
| Sheep | — | — | 50 | — |
| Sows | 1 | 1 | 1 | 2 |
| Other hogs | 6 | 8 | 8 | 16 |
| Poultry | 40 | 75 | 170 | 110 |
| Hours man labor on livestock | 810 | 1115 | 3140 | 3220 |
| Hours horse work on livestock | 77 | 101 | 296 | 259 |
| Farm receipts, dolls. | 899 | 1038 | 2979 | 3876 |
| Products used in household, dolls. | 312 | 319 | 580 | 580 |
| Farm expenses, dolls. | 262 | 437 | 1060 | 1592 |
| Net returns: | | | | |
| Actual, dolls. | 949 | 920 | — | — |
| Expected, dolls. | 1218 | 1303 | 2499 | 2864 |

[1] Detailed budgets for suggested systems 8 and 9 are shown in the appendix pages 125 to 134. [2] Excluding the value of the residence. [3] An additional man will be required for about 2 months during the crop growing season.

### Actual System 8

The expected net return from this system is approximately $1225. Three-fourths of the income is obtained from the sale of tobacco. Small sales of dairy products, poultry products and hogs are of minor importance. The total cash income from all sources is only about one thousand dollars per year, a volume of sales much too small for a 150-acre farm, especially when there are three men and six head of work stock available.

An outstanding weakness of this system is the lack of balance between enterprises. The acreage of feed crops is too large

and the amount of livestock is too small. Work stock receive more feed than all other classes of livestock combined. Since no legumes are grown the feed crops do not provide balanced

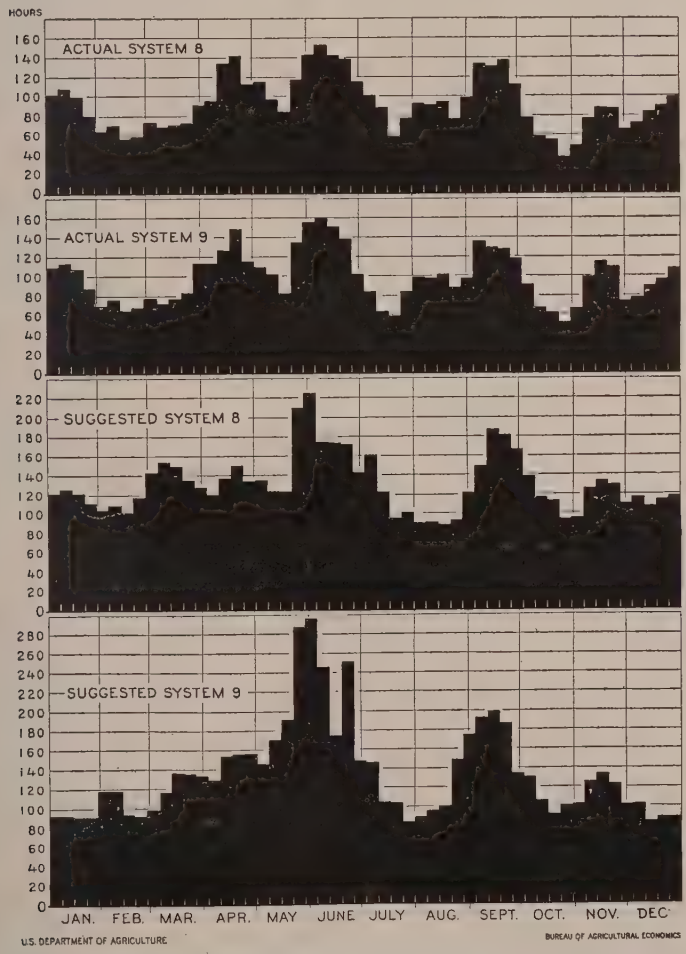
HOURS
ACTUAL SYSTEM 8
ACTUAL SYSTEM 9
SUGGESTED SYSTEM 8
SUGGESTED SYSTEM 9
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

Fig. 11. Seasonal distribution of man labor for actual and suggested systems for 150-acre farms.

rations for the livestock. Except for the period when a volunteer growth of Japan clover is available, pastures are inadequate.

The cropping system does not maintain the fertility of the

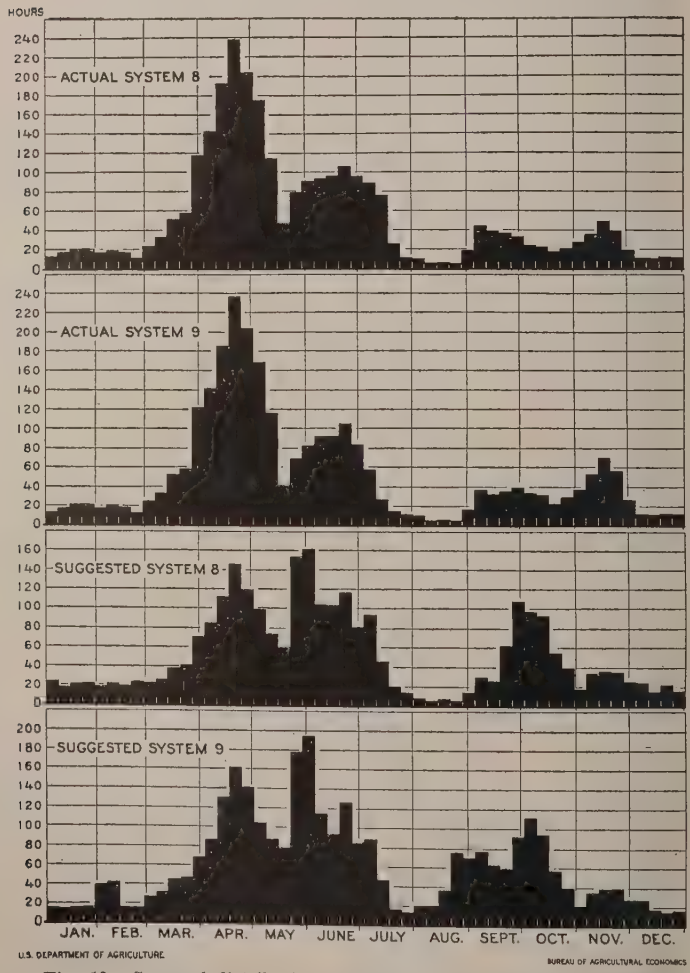
HOURS
ACTUAL SYSTEM 8
ACTUAL SYSTEM 9
SUGGESTED SYSTEM 8
SUGGESTED SYSTEM 9
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

**Fig. 12.** Seasonal distribution of horse work for actual and suggested systems for 150-acre farms.

soil. Corn yields are only about twenty bushels per acre and hay yields are less than one-half ton per acre. With the introduction of perennial clovers into the rotation, and by following a practice of keeping more of the land down in sod, crop yields could be greatly increased.

The men are not fully provided with profitable employment during the growing season, and tobacco stripping and tobacco marketing afford practically the only opportunity for productive work during the winter. The work stock are not kept busy at any time during the year. With an improved cropping program more livestock could be kept profitably. It is especially important that increases be made in those classes of livestock requiring relatively large quantities of hay and pasture.

#### Actual System 9

The expected net return from this system is approximately $1300. Tobacco is the only important source of income. Some income is derived from dairy cows, hogs and poultry, but these enterprises are of minor importance. The volume of production from the four enterprises is so small that the total cash sales from this 150-acre farm are only slightly more than one thousand dollars per year.

Over one-third of the tillable land is cultivated in corn and tobacco, and almost one-third is lying idle. Since no roughage is provided for in the cropping system hay is bought, along with large amounts of protein concentrates. The pasture land has only a light seeding of redtop and Japan clover. With better pasture seedings including some perennial clovers and additional grasses, and with legume hay in the cropping system, the livestock could be fed more economically. In addition, more livestock could be kept. The number of dairy cows could be increased to good advantage, or a flock of sheep might be added.

Plans for maintaining the fertility of the soil are wholly inadequate. No perennial clovers are grown, and since the cropping program includes neither small grain nor fall sown grasses all the crop land is left exposed to erosion and leaching during

the winter. No provision is made for building up the fertility of the land lying out.

The system provides little productive employment for the men except during April, May, June, August and September. The work stock are busy only during the rush planting season in the spring

### Suggested System 8

The expected net return from this system is approximately $2500. It provides four important sources of income, dairy cows, sheep, poultry and tobacco, and two minor sources, wheat and hogs.

The cropping program requires five 26-acre fields. In one field 21 acres of corn and 5 acres of tobacco are grown. Wheat is grown the second year, followed by mixed clovers and grass, which is cut for hay one year and pastured two years. The field is planted to corn and tobacco again the sixth year. Superphosphate is applied on corn at the rate of 400 pounds per acre and a complete fertilizer is applied on tobacco at the rate of 500 pounds per acre. Ground limestone is applied on wheat at the rate of 2 tons per acre. The dairy cows are fed corn, mixed clover hay, corn stover, bran and shorts, and cottonseed meal. Butterfat is sold and the skimmilk is fed to balance the grain rations for the hogs and poultry.

This system is particularly adapted to the more rolling or broken sections, where a large part of the land should be kept in mixed clovers and grass and a relatively small percent used for cultivated crops. Such farms located near a market for tomatoes, sweetpotatoes, or strawberries might find it advisable to substitute one of these cash crops for a part or all of the tobacco. With good use of the manure and fertilizers the farm should increase in fertility from year to year. The peak man labor and horse work requirements of this system are not so large as those of actual systems 8 and 9, and the expected net returns are more than twice as large.

### Suggested System 9

The expected net return from this system is approximately $2850. Two important sources of income, dairy cows and strawberries, and four minor sources, wheat, tomatoes, poultry and hogs, are provided.

The cropping program includes two rotations. The major rotation requires five 22-acre fields. The crops in this rotation are corn, one year; wheat, one year; mixed clover hay, one year; and mixed clover and grass pasture, two years. Superphosphate is applied on corn at the rate of 400 pounds per acre and ground limestone on wheat at the rate of 2 tons per acre. The minor rotation requires four 5-acre fields. Tomatoes are grown in one field, one-half of which is seeded to wheat and one-half to rye in the fall. The following spring the rye ground is planted to strawberries, and Japan clover and grass are seeded in the wheat. The strawberries are left three years and the Japan clover and grass pastured for two years. The field is planted to tomatoes again the fifth year. Strawberries and wheat and pasture are alternated in succeeding rounds of the rotation. Superphosphate is applied on tomatoes at the rate of 500 pounds per acre and on strawberries at the rate of 200 pounds per acre. The dairy cows are fed in a manner similar to that indicated under suggested system 8. Whole milk is sold. Tankage is bought to balance ration for the hogs, and bran and shorts and meat scrap are bought to balance the ration for the poultry.

This system is particularly adapted to farms located within six or eight miles of a market for tomatoes and strawberries, and accessible to a market for whole milk. For farms located farther from the market tobacco might be substituted for the tomatoes. Such a substitution would not materially change the rotation, but it would increase the man labor requirements slightly. The expected net return would not be greatly different.

## SYSTEMS FOR 200-ACRE FARMS

The acres of crops, numbers of livestock and expected returns for two systems actually followed on farms of approximately 200 acres each and two suggested systems for 200-acre

TABLE 9. Summary of two actual systems and two suggested systems[1] (200-acre farms)

| | Actual System 10 | Actual System 11 | Suggested System 10 | Suggested System 11 |
|---|---|---|---|---|
| Acres | 230 | 186 | 200 | 200 |
| Value of farm, dolls.[2] | 7700 | 13080 | 8000 | 10000 |
| Livestock, equipment and feed, dolls. | 1753 | 2070 | 3600 | 4200 |
| Number of men | 3 | 3 | 3[3] | 3[4] |
| Number of work stock | 6 | 4 | 6 | 6 |
| Acres in crops: | | | | |
| Corn for grain | 52 | 40 | 33 | 35 |
| Corn silage | — | — | 7 | — |
| Cowpea and soybean hay | 4 | 3 | — | — |
| Mixed clover hay | — | 16 | 25 | 29 |
| Grass hay | 16 | 6 | — | — |
| Sorghum | 2 | — | — | — |
| Wheat | — | 29[5] | 20 | 25 |
| Rye, cover crop and pasture | — | — | — | 4 |
| Tobacco | 11 | 6 | 10 | 4 |
| Strawberries (harvested) | — | — | — | 8 |
| Strawberries (young) | — | — | — | 4 |
| Sweetpotatoes | — | — | — | 4 |
| Other truck | 2 | 2 | 5 | 5 |
| Pasture | 67 | 27 | 75 | 63 |
| Hours man labor on crops | 4228 | 3637 | 4364 | 4676 |
| Hours horse work on crops | 3263 | 3307 | 3394 | 3798 |
| Number of livestock: | | | | |
| Dairy cows | 9 | 7 | 16 | 20 |
| Dairy heifers (1 to 2 years) | 5 | 3 | 4 | 5 |
| Dairy calves (under 1 year) | 9 | 7 | 4 | 5 |
| Veals | — | — | 10 | 14 |
| Sheep | 23 | — | 60 | — |
| Sows | 1 | 3 | 3 | 3 |
| Other hogs | 17 | 18 | 24 | 24 |
| Poultry | 45 | 35 | 240 | 260 |
| Hours man labor on livestock | 2193 | 1635 | 4360 | 4720 |
| Hours horse work on livestock | 214 | 150 | 418 | 380 |
| Farm receipts, dolls. | 1720 | 2221 | 4815 | 5985 |
| Products used in household, dolls. | 447 | 691 | 756 | 756 |
| Farm expenses, dolls. | 507 | 677 | 1525 | 2421 |
| Net return: | | | | |
| Actual, dolls. | 1660 | 2235 | — | — |
| Expected, dolls. | 1754 | 1758 | 4046 | 4320 |

[1] Detailed budgets for suggested systems 10 and 11 are shown in the appendix on pages 135 to 144. [2] Excluding the value of the residence. [3] An additional man will be required for about 1 month during the crop growing season. [4] An additional man will be required for about 3 months during the crop growing season. [5] Includes 5 acres oats.

farms are shown in Table 9. Three men and 6 horses do the work for actual system 10, and 3 men and 4 horses do the work for actual system 11. Three men and 6 horses are included for each of the suggested systems. The seasonal distribution of man labor and horse work for each system is shown in Figures 13 and 14.

### Actual System 10

The expected net return from this system is approximately $1750. It provides two important sources of income, tobacco

and dairy cows, and three minor sources, hogs, sheep and poultry.

An outstanding weakness of the system is the inadequacy of the cropping program. The feed crops do not provide a balanced ration for the livestock, and the rotation does not aid materially in maintaining soil fertility. The acreage of corn is too large and the acreage of legume hay too small. In order to provide enough protein for the dairy ration it is necessary to spend more than ten dollars per cow each year for supplementary feeds. With a larger acreage of legume hay the feeding could be done much more economically and more cows could be kept.

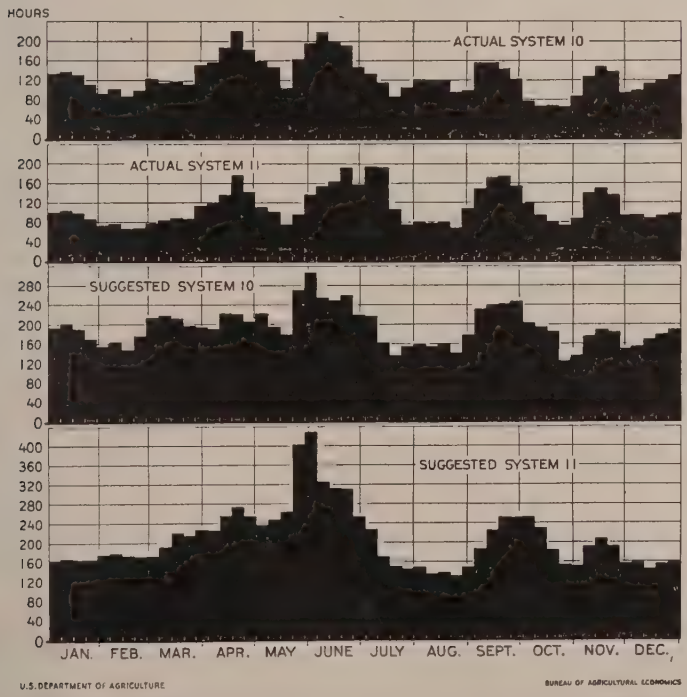
HOURS
ACTUAL SYSTEM 10
ACTUAL SYSTEM 11
SUGGESTED SYSTEM 10
SUGGESTED SYSTEM 11
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

**Fig. 13.** Seasonal distribution of man labor for actual and suggested systems for 200-acre farms.

Since corn occupies about three-fifths of the land in crops, and since all the legume hay is obtained from soybeans, it is necessary to break as much land each year as is left in sod.

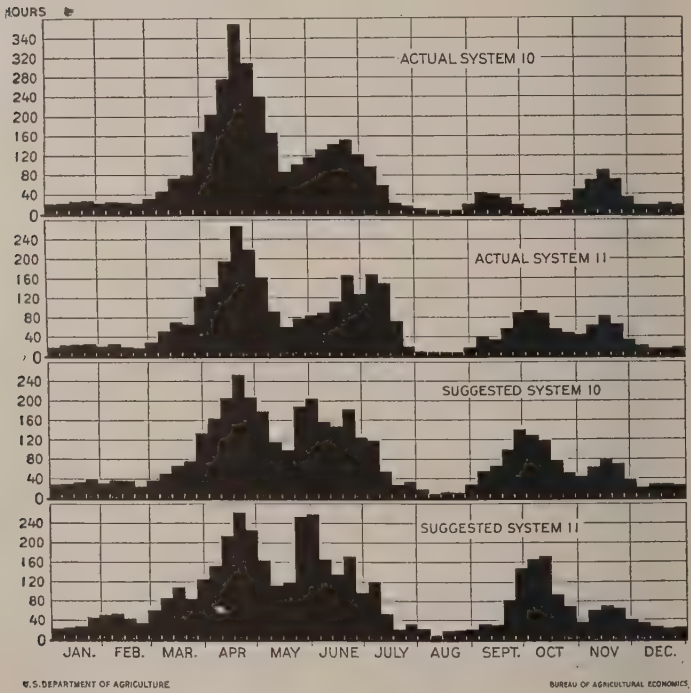
HOURS
ACTUAL SYSTEM 10
ACTUAL SYSTEM 11
SUGGESTED SYSTEM 10
SUGGESTED SYSTEM 11
JAN. FEB. MAR. APR MAY JUNE JULY AUG SEPT. OCT NOV DEC.
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

**Fig. 14. Seasonal distribution of horse work for actual and suggested systems for 200-acre farms.**

Such a combination of crops makes it very difficult to maintain the fertility of the soil. In spite of the use of considerable quantities a manure from dairy cows and work stock, the yields of corn are normally less than twenty-five bushels per acre and the yields of tobacco only 700 pounds per acre.

A point in favor of the system is that the man labor needs are fairly well distributed thruout the year. Dairy cows, hogs, sheep and tobacco provide productive work during the winter,

and the tobacco and feed crops give a reasonably good distribution of man labor and horse work during the growing season.

### Actual System 11

The expected net return from this system is approximately $1750. It provides two important sources of income, tobacco and wheat, and three minor sources, dairy cows, hogs and poultry.

The cropping program includes perennial legumes for hay and pasture. The feed crops provide good rations for the livestock, so that the expenditures for protein feeds for the cows were kept low. All of the feed crops are fed on the farm and the manure produced by livestock is used to improve the fertility of the soil. This makes it unnecessary to purchase large quantities of commercial fertilizers. Corn yields normally average more than forty bushels per acre and tobacco yields more than 1000 pounds per acre.

The crops and livestock provide a good distribution of labor requirements thruout the year. The livestock and tobacco furnish profitable employment during the winter, and the mixed clover hay and wheat help to distribute the labor requirements during the growing season. Owing to better balance of enterprises, considerably less man labor is required to care for the crops and livestock in this system than is required in actual system 10.

### Suggested System 10

The expected net return from this system is approximately $4050. It provides three important sources of income, tobacco, dairy cows and poultry, and three minor sources, sheep, hogs and wheat.

The cropping program includes two rotations. The major rotation requires six 20-acre fields. Corn is grown for two consecutive years, 7 acres of silage corn being included the second year. In the fall of the second year half of the field is sown to rye, followed by a mixture of clovers and grasses for pasture, and half to wheat, followed by mixed clovers and grass for hay.

The wheat is harvested the third year and the rye field pastured. The fourth year the half in mixed clover and grass following wheat is cut for hay, and the other half pastured. The entire field is pastured the fifth and sixth years, and planted to corn again the seventh year. Superphosphate is applied on corn at the rate of 400 pounds per acre the first year, 200 pounds per acre the second year, and ground limestone on wheat at the rate of 2 tons per acre.

The minor rotation requires five 10-acre fields. The crops are as follows: tobacco, one year; wheat, one year; mixed clover hay, two years; and mixed clover and grass pasture, one year. A complete fertilizer is applied on tobacco at the rate of 500 pounds per acre and ground limestone on wheat at the rate of 2 tons per acre. The dairy cows are fed corn, mixed clover hay, silage and cottonseed meal. Butterfat is sold and skim milk is used to balance the rations for the hogs and poultry. Sheep are fed corn, mixed clover hay, silage, oats, and bran and shorts.

This system is particularly adapted to farms with poorer soils located ten to twenty miles from market. The products grown for sale are of such a nature that they can be hauled long distances to market. A large percent of the land is kept in grass and clover sod which makes it relatively easy to maintain or improve fertility of the soil. In addition to the money returns from systems of this kind other profits accrue in the improvement of the productivity of the soil.

### Suggested System 11

The expected net return from this system is approximately $4325. It provides two important sources of income, strawberries and dairy cows, and four minor sources, tobacco, wheat, poultry and hogs.

The cropping program includes two rotations. The major rotation requires four 35-acre fields. Corn is grown in one field. Following the corn 25 acres are seeded to wheat, followed by mixed clovers and grass for hay, and 10 acres are seeded to a mixture of clovers and grasses for pasture. The wheat is harvested the second year and mixed clover hay the third year.

The pasture mixture is pastured the second and third years. Both parts of the field are pastured the fourth year and planted to corn again the fifth year. Superphosphate is applied on corn at the rate of 400 pounds per acre and ground limestone on wheat at the rate of 2 tons per acre.

The minor rotation requires four 8-acre fields. Tobacco is grown on one half of one field and sweetpotatoes on the other half. Following sweetpotatoes rye is seeded in the fall and mixed clovers and grass sown the following spring. This remains in clover and grass for 3 years, being cut for hay one year and pastured two years. Following tobacco the other half of the field is seeded to a rye cover crop in the fall, planted to strawberries the following spring and left 3 years. Tobacco and sweetpotatoes are planted again the fifth year, the sweetpotatoes following strawberries and the tobacco following mixed clover pasture. That is, the tobacco and strawberries, and the sweetpotatoes, hay and pasture crops are alternated in succeeding rounds of the rotation. A complete fertilizer is applied on tobacco at the rate of 500 pounds per acre and superphosphate on strawberries at the rate of 200 pounds per acre. A complete fertilizer is applied on sweetpotatoes at the rate of 250 pounds per acre, and on the rye which follows them ground limestone is applied at the rate of 2 tons per acre. The cows are fed corn, mixed clover hay, corn stover, bran and shorts, and cottonseed meal. Whole milk is sold. Tankage is bought to balance the ration for the hogs, and meat scrap and bran and shorts are bought to balance the ration for the poultry.

This system is particularly adapted to farms located within eight or ten miles of a strawberry shipping point. It is adapted to farms operated either by hired labor or tenant labor, since the strawberries can be handled by the landlord and the tobacco can be handled on the share basis by tenants or croppers. Such a system is also well suited to the needs of a landlord who has two or three sons grown or about grown who wish to stay on the same farm. Although it provides for more cultivated crops than suggested system 10 this system keeps a good percent of the land seeded to mixed clovers and grass, and with judicious use of

manure and commercial fertilizer the fertility of the soil can be maintained or increased.

### SYSTEMS FOR 300-ACRE FARMS

The acres of crops, numbers of livestock and expected net returns for two systems actually followed on farms of approximately 300 acres each and two suggested systems for 300-acre farms are shown in Table 10. Four men and 9 horses do the

**TABLE 10. Summary of two actual systems and two suggested systems[1] (300 acre farms)**

| | Actual System 12 | Actual System 13 | Suggested System 12 | Suggested System 13 |
|---|---|---|---|---|
| Acres | 295 | 313 | 300 | 300 |
| Value of farm, dolls.[2] | 10800 | 18600 | 10000 | 12000 |
| Livestock, equipment and feed, dolls. | 898 | 1963 | 6400 | 5400 |
| Number of men | 4 | 3 | 3[3] | 3[4] |
| Number of work stock | 9 | 6 | 7 | 7 |
| Acres in crops: | | | | |
| Corn for grain | 72 | 44 | 45 | 40 |
| Corn silage | — | — | — | 8 |
| Cowpea and soybean hay | — | 25 | — | — |
| Mixed clover hay | — | 16 | 52 | 38 |
| Redtop hay | 5 | — | — | — |
| Sorghum | 7 | — | — | — |
| Wheat | 5 | 103 | 26 | 32 |
| Rye, cover crop and pasture | 3[5] | — | — | 4 |
| Tobacco | 3 | 9 | 7 | 4 |
| Strawberries (harvested) | — | — | — | 8 |
| Strawberries (young) | — | — | — | 4 |
| Tomatoes | — | — | — | 4 |
| Other truck | 1 | .5 | 6 | 6 |
| Pasture | 35 | 92 | 130 | 122 |
| Hours man labor on crops | 3212 | 5105 | 4226 | 5482 |
| Hours horse work on crops | 3833 | 6754 | 3717 | 4772 |
| Number of livestock: | | | | |
| Dairy cows | 2 | 6 | 25 | 22 |
| Bull | — | 1 | — | — |
| Dairy heifers (1 to 2 years) | — | 1 | 6 | 5 |
| Dairy calves (under 1 year) | 2 | 7 | 6 | 5 |
| Veals | — | — | 17 | 15 |
| Sheep | — | 37 | 120 | 100 |
| Boar | — | 1 | — | — |
| Sows | — | 4 | 3 | 3 |
| Other hogs | 4 | 45 | 24 | 24 |
| Poultry | 36 | 38 | 300 | 250 |
| Hours man labor on livestock | 894 | 1927 | 6310 | 5630 |
| Hours horse work on livestock | 85 | 246 | 602 | 553 |
| Farm receipts, dolls. | 804 | 4690 | 6188 | 7168 |
| Products used in household, dolls. | 356 | 320 | 854 | 854 |
| Farm expenses, dolls. | 509 | 1321 | 2118 | 2878 |
| Net returns: | | | | |
| Actual, dolls. | 651 | 3689 | — | — |
| Expected, dolls. | 769 | 4014 | 4924 | 5144 |

[1] Detailed budgets for suggested systems 12 and 13 are shown in the appendix on pages 145 to 154. [2] Excluding the value of the residence. [3] An additional man will be required for about 8 months. [4] An additional man will be required for about 10 months. [5] Wheat.

work for actual system 12, and 3 men and 6 horses do the work for actual system 13. The suggested systems are for 3 men and 7 horses. Some additional man labor will probably be required during April, May and June each year for each of the suggested

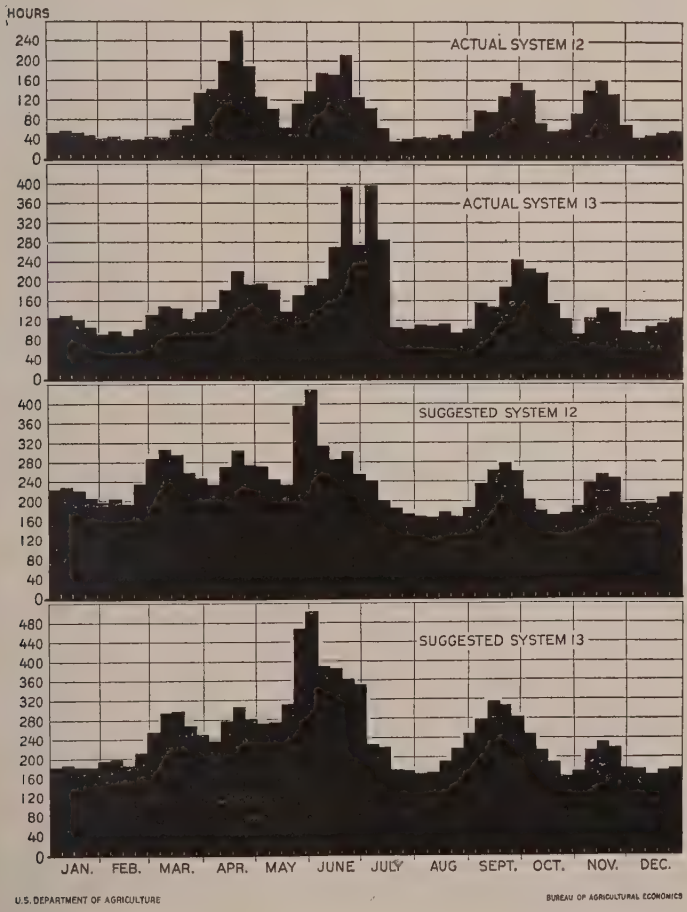
HOURS
ACTUAL SYSTEM 12
ACTUAL SYSTEM 13
SUGGESTED SYSTEM 12
SUGGESTED SYSTEM 13
JAN. FEB. MAR. APR. MAY JUNE JULY AUG SEPT. OCT. NOV. DEC.
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

Fig. 15. Seasonal distribution of man labor for actual and suggested systems for 300-acre farms.

systems. The seasonal distribution of man labor and horse work for each system is shown in Figures 15 and 16.

### Actual System 12

The expected net return from this system is approximately $775. Corn is the only important source of income. Small

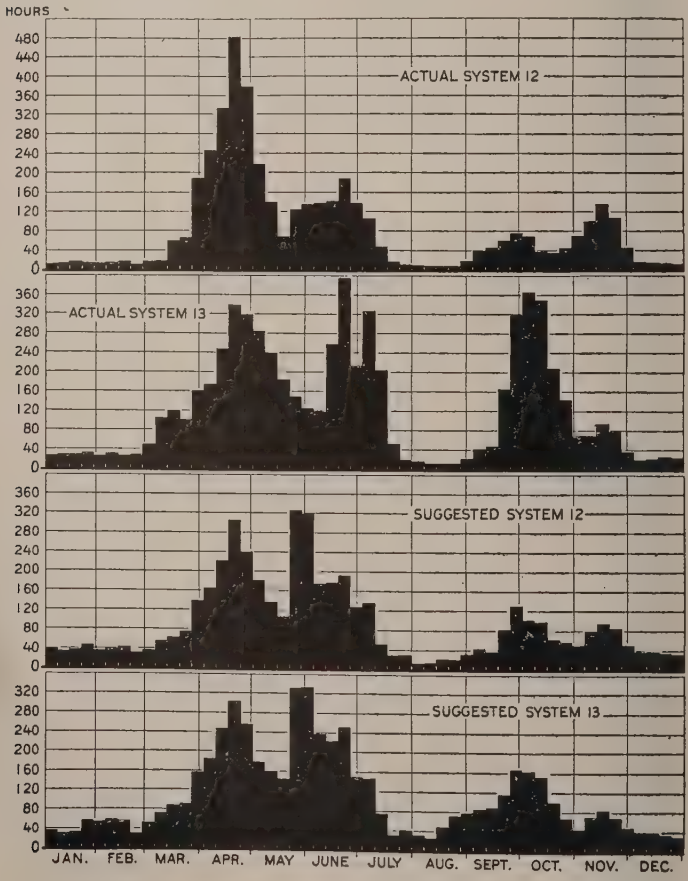
HOURS
ACTUAL SYSTEM 12
ACTUAL SYSTEM 13
SUGGESTED SYSTEM 12
SUGGESTED SYSTEM 13
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

Fig. 16. Seasonal distribution of horse work for actual and suggested systems for 300-acre farms.

acreages of tobacco and sorghum are produced for sale and small amounts of surplus dairy and poultry products are sold, but more than half of the cash receipts come from the sale of corn.

One of the outstanding weakneses of the system is the lack of balance between feed crops and cash crops and the selection of cash crops. Too much land is used in producing corn, four-fifths of the crop land being devoted to that crop. A yield of only 25 bushels per acre is obtained. With such low yields it is impossible to grow corn profitably for sale. Since good yields of tobacco are obtained a larger acreage of this crop could probably be grown advantageously to replace corn as an important source of income.

Another outstanding weakness of this system is the poor selection of feed crops and the lack of balance between feed crops and livestock. Very little productive livestock is kept. Not enough hay is produced to supply the needs of the livestock and no legume hays are provided.

In order to keep up the fertility of soils that are handled in this way it is necessary to purchase large amounts of complete fertilizer. This is a very uneconomical method of maintaining the productivity of the soil. By following a rotation including mixed clover for hay and pasture, and with the introduction of dairy cows and sheep to utilize these feeds, the fertility of the land could be maintained much more economically.

Another weakness of the system is the distribution of man labor and horse work requirements. For a short period in early summer when the land is being prepared and planted the requirements are heavy. During other seasons the men are not fully employed, and for a large part of the year there is practically no productive work that can be done on crops or livestock. Nine head of work stock are kept, and while they are all used for a few days in the spring and early summer, the majority of this stock is idle during the most of the year.

#### Actual System 13

The expected net return from this system is approximately $4000. It provides two important sources of income, wheat and

hogs, and three minor sources, tobacco, dairy cows and sheep. In addition, small amounts of surplus poultry products and feed crops are sold.

The combination of crops and livestock gives a good seasonal distribution of man labor and horse work, so that 3 men with 6 horses accomplish a great deal more than 4 men with 9 horses accomplish in actual system 12. However, for the general upland farms in the Purchase, this system could be greatly improved by a better balance of cash crops and feed crops. The wheat acreage is so large that it is very difficult to maintain the fertility of the soil. With the present acreage of crops on this size farm it is necessary that the land be cultivated or seeded to wheat about two years out of three. The soil could be maintained and crops produced much more economically if wheat was decreased to about one-third or one-half the present acreage and the mixed clover hay increased to about twice the present acreage.

This change in crops would permit a considerable increase in the number of sheep and dairy cows and a better utilization of the pasture. It would also provide more manure which could be used on the tobacco and corn to good advantage. Such a combination of crops and livestock would also give an even better distribution of man labor and horse work requirements. With a larger percent of the returns coming from livestock the income would be more nearly the same from year to year, and the returns would normally be greater than those obtained from the present system.

### Suggested System 12

The expected net return from this system is approximately $4925. It provides three important sources of income, dairy cows, sheep and poultry, and three minor sources, tobacco, wheat and hogs.

The cropping program requires five 52-acre fields. In one field 45 acres of corn and 7 acres of tobacco are grown. One half of this field is seeded to wheat in the fall; the other half is seeded to rye. Mixed clovers and grass are seeded on the entire

field in the spring of the second year, the half in rye being pastured, and the wheat harvested for grain. Mixed clover hay is cut the third year and the field pastured the fourth and fifth years. The field is planted to corn and tobacco again the sixth year. Superphosphate is applied on corn at the rate of 400 pounds per acre and a complete fertilizer applied on tobacco at the rate of 500 pounds per acre. Ground limestone is applied on rye and wheat at the rate of 2 tons per acre. The dairy cows are fed corn, mixed clover hay, corn stover, bran and shorts, and cottonseed meal. Whole milk is sold. Tankage is bought to balance the ration for the hogs, and bran and shorts and meat scrap are bought to balance the ration for the poultry. The sheep are fed corn, linseed meal and mixed clover hay.

Like suggested system 10, this system is particularly adapted to large farms located some distance from market. They are both rather extensive types of farming, and the products sold are of such nature that they can be hauled long distances to market. With about 80 percent of the land seeded to mixed clovers and grass and with the large amount of livestock it is very easy to maintain crop yields well above the average of the section, even on rolling lands. With slight modifications this general system can be adapted to farms larger or smaller than 300 acres.

#### Suggested System 13

The expected net return from this system is approximately $5150. It is a rather highly diversified system of farming. It provides three important sources of income, strawberries, dairy cows and sheep, and five minor sources, poultry, hogs, wheat, tobacco and tomatoes.

The cropping program requires five 52-acre fields. In one field 40 acres of corn, 8 acres of silage and 4 acres of tomatoes are grown. Thirty-two acres of wheat and 20 acres of rye are seeded in the fall. The part of the field in wheat is seeded to mixed clovers and grass the following spring, which is cut for hay the third year and pastured the fourth and fifth years. Sixteen acres of the part of the field in rye are seeded to a mix-

ture of clovers and grasses which is pastured during that year and the two years following. The remaining 4 acres are planted to tobacco the second year, followed by strawberries the third, fourth and fifth years. The field is planted to corn, corn silage and tomatoes again the sixth year. Superphosphate is applied on corn and corn silage at the rate of 400 pounds per acre and on tomatoes at the rate of 500 pounds per acre. Ground limestone is applied on wheat at the rate of 2 tons per acre. A complete fertilizer is used on tobacco at the rate of 350 pounds per acre and superphosphate on strawberries at the rate of 200 pounds per acre. The cows are fed corn, mixed clover hay, silage and cottonseed meal. Whole milk is sold. Tankage is bought to balance the ration for the hogs, and bran and shorts and meat scrap are bought to balance the ration for the poultry. The sheep are fed corn, oats and mixed clover hay.

This system is adapted to large farms located within a reasonable distance of a market for tomatoes and strawberries. It offers an opportunity for the good farm manager to capitalize upon his ability to manage. Some of the crops are intensive in nature and require large amounts of time at certain seasons of the year, while some of the crops and livestock are extensive and require very little labor for the amount of land involved.

### SIZE OF FARM AND NET RETURNS

As suggested in the preceding sections, many farmers in the Purchase can increase their profits by more wisely selecting the crops and livestock, or by making increases along some lines and decreases along others. Often further increases in returns may be made by increasing the size of the unit operated. The acreage of many farms in the Purchase was determined when tobacco was the principal source of income. Few crops require as much man labor and horse work as tobacco; consequently when other enterprises are substituted for tobacco the size of the business unit usually is decreased, unless the acreage is increased.

The outlines of the most profitable systems in the different size groups are shown in Table 11. Only one system is brought

forward for each group. As explained previously, in calculating the expected net returns in the preceding tables expenses for man labor, taxes and interest on the investment have not been deducted. In the preceding tables, only systems requiring approximately equal acreages, investments and amounts of man

**TABLE 11. Summary of most profitable systems for farms with different acreages**

| | Suggested System 3 | Suggested System 5 | Suggested System 7 | Suggested System 9 | Suggested System 11 | Suggested System 13 |
|---|---|---|---|---|---|---|
| Acres | 60 | 80 | 100 | 150 | 200 | 300 |
| Value of farm, dolls.[1] | 3500 | 4500 | 5500 | 8000 | 10000 | 12000 |
| Livestock, equipment and feed, dolls. | 1450 | 1700 | 2100 | 3000 | 4200 | 5400 |
| Number of men | 1 | 1 | 2 | 2 | 3 | 3 |
| Number of work stock | 2 | 3 | 4 | 4 | 6 | 7 |
| Acres in crops: | | | | | | |
| Corn for grain | 12 | 16 | 16 | 22 | 35 | 40 |
| Corn silage | --- | --- | --- | --- | --- | 8 |
| Mixed clover hay | 7.5 | 8 | 16 | 22 | 29 | 38 |
| Japan clover hay | --- | 4 | --- | --- | --- | --- |
| Wheat | 6 | 8 | 16 | 24.5 | 25 | 32 |
| Rye, cover crop and pasture | 1.5 | 2 | 2.5 | 2.5 | 4 | 4 |
| Tobacco | 3 | 4 | 5 | --- | 4 | 4 |
| Strawberries (harvested) | 3 | 4 | 5 | 5 | 8 | 8 |
| Strawberries (young) | 1.5 | 2 | 2.5 | 2.5 | 4 | 4 |
| Sweetpotatoes | --- | --- | --- | --- | 4 | --- |
| Tomatoes | --- | --- | --- | 5 | --- | 4 |
| Other truck | 2 | 2 | 2.5 | 3 | 5 | 6 |
| Pasture | 15 | 18 | 23.5 | 49 | 63 | 122 |
| Hours man labor on crops | 1741 | 2332 | 3003 | 2978 | 4676 | 5482 |
| Hours horse work on crops | 1216 | 1614 | 2016 | 2646 | 3798 | 4772 |
| Number of livestock: | | | | | | |
| Dairy cows | 5 | 6 | 10 | 15 | 20 | 22 |
| Dairy heifers (1 to 2 yrs.) | 2 | 2 | 3 | 4 | 5 | 5 |
| Dairy calves (under 1 yr.) | 2 | 2 | 3 | 4 | 5 | 5 |
| Veals | 2 | 3 | 6 | 10 | 14 | 15 |
| Sheep | --- | --- | --- | --- | --- | 100 |
| Sows | 1 | 2 | 1 | 2 | 3 | 3 |
| Other hogs | 8 | 16 | 8 | 16 | 24 | 24 |
| Poultry | 125 | 100 | 100 | 110 | 260 | 250 |
| Hours man labor on livestock | 1470 | 1645 | 2250 | 3220 | 4720 | 5630 |
| Hours horse work on livestock | 120 | 143 | 178 | 259 | 380 | 553 |
| Farm receipts, dolls. | 1958 | 2407 | 3207 | 3876 | 5985 | 7168 |
| Products used in household, dolls. | 324 | 324 | 460 | 580 | 756 | 854 |
| Farm expenses, dolls. | 832 | 989 | 1391 | 1592 | 2421 | 2878 |
| Expected net return, including products used in household | 1450 | 1742 | 2276 | 2864 | 4320 | 5144 |
| Taxes | 40 | 50 | 62 | 89 | 113 | 137 |
| Labor cost, if hired, excluding operator[2] | 63 | 204 | 439 | 612 | 1201 | 1317 |
| Earnings of operator and return on investment | 1347 | 1488 | 1775 | 2163 | 3006 | 3690 |

[1] Excluding the value of the residence. [2] Hired labor is charged at 16 cents per hour. The amount hired is obtained by adding 15 percent to the hours shown for crops and livestock and deducting 3300 hours as operator's labor.

labor have been compared. In Table 11 the acreage, investments and man labor requirements are different for different systems, and deductions are made for taxes and the cost of all man labor except that of one man. The remainders represent the returns for the operators' labor and management and the investment in land, buildings, livestock, equipment and feeds. Under conditions discussed in the preceding sections, the chances appear about equal for a return for these items of approximately $1350 for 60-acre systems similar to suggested system 3, $1475 for 80-acre systems similar to suggested system 5, $1775 for 100-acre systems similar to suggested system 7, $2150 for 150-acre systems similar to suggested system 9, $3000 for 200-acre systems similar to suggested system 11, and $3700 for 300-acre systems similar to suggested system 13. If the value of the products furnished the operator's household were deducted in each case the remainder would represent the cash return left for upkeep of the home, living expenses, savings and investments.

As stated previously, fair to good management is assumed in calculating the expected net returns for each system. With unusually good management returns larger than those shown may be obtained from any of the systems. More capable managers are required for the larger farms. However, a good manager will usually make larger profits operating a larger unit than by operating a small one and, in the case of the smaller farms, if the farmer has the capacity to supply exceptional management, it will usually pay to consider a larger acreage.

The acreage of the farm may be increased by buying or renting additional land, or by selling the present farm and buying or renting a larger one. Good farmers can usually obtain credit thru Farm Loan Associations, Joint-Stock Land Banks, insurance companies and other agencies that will make such transfers possible.

There are some farmers in the Purchase who will not find it advisable to increase the size of their farms. While the opportunities for profits are usually greater with large farms than with small ones the possibilities of losses are also greater.

Some farmers are not temperamentally suited to handle large units. Many farmers have reached the stage in life when they are not able or do not care to assume the responsibility for large undertakings. Such farmers will find the smaller farming units more advisable.

There is a best size of farm for every farmer, depending largely upon the kind of farming and his own ability and inclinations. The final decision as to the number of acres to operate must depend upon the farmer's own appraisal of his ability, and that of those upon whom he depends for credit. The material presented in this bulletin should be helpful to farmers of the Purchase in determining the size of farm and system of farming that they can operate most effectively.

## PLANNING FOR PROFITABLE FARMING

Often prices or conditions on the farm may be such as to make it advisable to reorganize the farm completely and introduce a new system of farming, or one markedly different from the one that has been followed. In trying to decide whether or not a change will be advisable a farmer should look about in his own community, and in other communities that have similar conditions, and consider the results that other farmers are getting with other crops, livestock and systems. He should also study bulletins and reports showing the requirements and production of other crops and livestock, the prices of farm products and the results obtained on other farms.

A study of the systems outlined in this bulletin should help in determining the possibilities of different crops and livestock. The outlines of the actual and suggested systems for farms having resources similar to those of the farm for which plans are being made should be studied and the expected returns compared with those being obtained with the present system.

A system that has given good results on one farm may not give good results on another farm, even in the same community, since no two farms are exactly alike. However, this general appraisal of other systems is a good starting place. From it a farmer should get a general idea of the crops and livestock best

adapted to his conditions, as well as learn how they may be combined into more profitable systems of farming.

The use of carefully worked-out budgets, similar to that shown on pages 51, 52 and 53, is the most accurate way to compare the various systems that may be considered. If these budgets are to lead to correct conclusions they must be based on normal crop requirements and yields, normal livestock requirements and production, and prices for the products to be sold and expense items that prevail under usual conditions in the section. Therefore, before budgets are made, the crops and livestock that are to be considered should be listed and normal requirements, yields and production recorded for each, on the acre or head basis, as indicated by Tables 1 and 2. Then the products to be sold and expense items should be listed, and the prices expected under usual conditions in the section recorded for each, as indicated by Table 3. (See pages 32 to 38.)

In Tables 1 and 2 the hours of man labor and horse work are shown, along with the other requirements for crops and livestock. In cases in which the farmer knows approximately how many acres of the different crops and how many head of the different kinds of livestock the men and teams can handle, it will not be necessary to estimate man labor and horse work requirements for the different enterprises. It is important, however, that the peak periods in the demands of these enterprises for man labor and horse work be kept in mind.

The next step in making the budget is to decide upon the particular combination of crops and livestock that is to be considered. After this decision has been made, the crops are listed and the acreages, production, and amounts to be fed and sold are entered, as shown in Section A of the budget on pages 51 to 53. The crops are then listed again in the same order as in the preceding form, and the requirements and cost of purchased items are recorded, as shown in Section B.

Next list the different classes of livestock and enter the number and requirements of each and the cost of items to be bought, as shown in Section C. On another form list the livestock and livestock products in the same order as on the preceding form

and show the quantities to be fed, used in the home and sold, and the value of the quantities to be sold and used in the home, as shown in Section D.

Finally, the cost and value totals are brought forward from Sections A, B, C and D, as shown in Section E. In addition to the direct expenses for crops and livestock brought forward, estimates are included for labor to be hired, fence repair, taxes and other overhead items.

Budgets should be worked out in this way for all the different systems that are being considered. These budget statements should then be compared. In comparing the statements for the different systems each should be considered critically for the purpose of determining the effect of each system on the fertility of the soil, the kinds of markets available for each of the products sold, how well the feed crops provide balanced rations for the livestock, how well the crops and livestock fit together, and how well the non-marketable products such as pasture, straw, stover and skimmilk are utilized with each. With these facts in mind, as well as the returns that may reasonably be expected from each system as shown by the budget statements, one of the systems should be selected as the one to be followed.

It is not usually necessary to make comparisons of this kind, involving other systems of farming, each year. Marked changes in the system of farming are expensive, and often involve learning new things or buying new equipment, and after a system has been decided upon it should be followed until conditions of the period or on the farm have undergone a marked change. A farmer should continually be on the alert, however, for new developments, and if it appears that changed conditions influencing the prices of important products are likely to prevail and influence the prices for a period of years, marked changes in the system of farming should be made as quickly as possible, or a new system adopted. On the other hand, if the prices expected during the coming year appear to be due to conditions more or less temporary in nature, minor changes only should be made in the present system.

In considering minor changes in the system of farming comparisons may be made as to the increases and decreases in sales and expenses that may be expected when some crops or livestock are substituted for others. In making these comparisons only the receipts and cash expenses for the enterprises need be considered. It will generally be advisable to consider increases in the acreage of the crops and the numbers of the livestock for which relatively high prices are expected, and decreases in those lines in which relatively low prices are expected.

In making these changes care should be exercised lest too much weight be given to the prices of the present or of the immediate past. Conditions influencing prices are continually changing. The prices of farm products fluctuate widely from year to year, and the changes are seldom uniform. For many products there are fairly definite price cycles and price trends. As much time as possible should be given to the study of price trends and cycles and the conditions influencing prices before changes are finally decided upon. Comparisons involving these minor changes are advisable at the beginning of each year.

## FARMING COMPARED WITH OTHER UNDERTAKINGS

From time to time farmers do and should compare the opportunities of farming with those of other undertakings. Too often these comparisons are made between the returns being obtained from the particular system of farming being followed at that time and the returns promised by the other undertakings. Consideration should be given to the returns that may be expected from other systems of farming on this farm or other farms. In other words, the comparisons have often been made between what was being done on a particular farm and what might be done in other undertakings, when they should be made between what might be done on this farm, what might be done on other farms and what might be done in other undertakings.

The returns for the investment and labor and management of the operator for farms of different sizes shown in Table 11 may be compared with returns promised by other undertakings. However, in making such comparisons it will be necessary to

consider any differences that may be expected in the costs of living. Most other undertakings require that one live in a town or city, where rents and food prices are higher than in the country. In making the above calculations of the returns from farming the garden, truck and livestock products used in the household have been valued at farm prices. The same products purchased in town would probably cost about fifty percent more, and this amount should be deducted from the returns promised by other undertakings if the comparisons are to be made fairly. Also, a further deduction of from $400 to $800 per year should be made for the additional cost of maintaining a residence in the city. The other systems outlined in the preceding sections may be included in similar comparisons, if deductions are made similar to those made in Table 11.

The basis of comparison suggested above includes only the financial considerations. There are personal and social advantages and disadvantages of living in the country and the city that should be carefully weighed. These social and personal advantages and disadvantages are evaluated by different persons in different ways, and the way they are evaluated by a particular individual should have an important influence upon his choice of an undertaking.

# APPENDIX.

## BUDGETS FOR THE SUGGESTED SYSTEMS OF FARMING

TABLE 12. Budget for suggested system 1 (60-acre farm—1 man, 2 horses)
Section A. Crops: Acreage, production and disposition

| Crop | Acres | Production | Farm Use | | Sales | |
|---|---|---|---|---|---|---|
| | | | Feed | Seed | Amount | Value |
| Tobacco | 3 | 2850 lbs. | | | 2850 lbs. | $285 |
| Corn, grain | 12 | 420 bus. | 418.5 bus. | 1.5 bus. | | |
| Corn, stover | 4 | 9200 lbs. | 9200 lbs. | | | |
| Wheat | 8 | 112 bus. | | 10 bus. | 102 bus. | 133 |
| Soybean hay | 1 | 3000 lbs. | 3000 lbs. | | | |
| Mixed clover hay | 8 | 20000 lbs. | 20000 lbs. | | | |
| Clover and grass | 16 | Pasture | Pasture | | | |
| Orchard and truck | 2 | | | | | |
| Lots | 4 | | | | | |
| Woodland | 6 | | | | | |
| Total | | | | | | $418 |

TABLE 12. Budget for suggested system 1 (60-acre farm—1 man, 2 horses) (Continued)
Section B. Crops: Man Labor, horse work and other requirements

| Crop | Man Hrs. | Horse Hrs. | Seeds and Plants | | Fertilizer and Other Materials | | |
|---|---|---|---|---|---|---|---|
| | | | Amount | Value | Kind | Amount | Value |
| Tobacco | 750 | 270 | | | Fertilizer (5-9-4)<br>Canvas<br>Arsenate of lead<br>Building expense<br>Equipment expense | 1500 lbs.<br>20 yds.<br>12 lbs. | $30<br>1<br>3<br>15<br>4 |
| Corn | 376 | 496 | 1.5 bus. | Farm | Superphosphate<br>Twine<br>Equipment expense | 4800 lbs.<br>8 lbs. | 53<br>1<br>9 |
| Wheat | 120 | 176 | 10 bus. | Farm | Contract threshing<br>Twine<br>Equipment expense | 112 bus.<br>16 lbs. | 13<br>3<br>6 |
| Soybean hay | 20 | 35 | 1.25 bus. | $3 | Inoculation<br>Equipment expense | | Farm<br>$1 |
| Mixed clover hay | 88 | 96 | 24 lbs. Red clover<br>8 lbs. Alsike<br>24 lbs. Alfalfa<br>40 lbs. Orchard grass | 7<br>2<br>6<br>7 | Limestone<br>Equipment expense | 16 T. | 52<br>5 |
| Total | 1354 | 1073 | | $25 | Fertilizer and other materials<br>Building expense<br>Equipment expense | | 156<br>15<br>25 |

**TABLE 12. Budget for suggested system 1 (60-acre farm—1 man, 2 horses) (Continued)**
**Section C. Livestock: Number, and man labor, horse work, feed and material requirements.**

| Livestock | Number | Man Hrs. | Horse Hrs. | Home Grown Feeds | | Purchased Feed and Other Expenses | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Kind | Amount | Kind | Amount | Value |
| Dairy cows | 6 | 900 | 60 | Corn<br>Legume hay<br>Corn stover | 96 bus.<br>15000 lbs.<br>6000 lbs. | Bran and shorts<br>Cottonseed meal<br>Building expense<br>Equipment expense<br>Miscellaneous | 1200 lbs.<br>600 lbs. | $22<br>13<br>18<br>9<br>15 |
| Veal calves | 3 | 15 | 3 | Whole milk | 1440 lbs. | | | |
| Dairy calves | 2 | 20 | 2 | Corn<br>Legume hay<br>Whole milk | 2 bus.<br>400 lbs.<br>960 lbs. | Bran and shorts<br>Linseed meal<br>Bldg. & miscl. expense | 60 lbs.<br>20 lbs. | 1<br>1<br>1 |
| Dairy heifers | 2 | 20 | 2 | Corn<br>Legume hay | 4 bus.<br>2000 lbs. | Bran and shorts<br>Bldg. & miscl. expense | 200 lbs. | $4<br>1 |
| Sow and pigs | 1 | 80 | 16 | Corn | 112 bus. | Tankage<br>Equipment expense<br>Miscellaneous | 320 lbs. | 12<br>2<br>2 |
| Poultry | 100 | 400 | 30 | Corn | 118 bus. | Meat scrap<br>Bran and shorts<br>Baby chick feed<br>Oyster shell<br>Building expense<br>Miscellaneous | 500 lbs.<br>2000 lbs.<br>200 lbs.<br>400 lbs. | 22<br>36<br>10<br>4<br>20<br>1 |
| Work stock | 2 | 90 | 10 | Corn<br>Legume hay<br>Corn stover | 80 bus.<br>5600 lbs.<br>2800 lbs. | Building expense<br>Equipment expense<br>Depreciation<br>Miscellaneous | | 7<br>4<br>14<br>4 |
| Total | | 1525 | 123 | Corn<br>Legume hay<br>Whole milk<br>Corn stover | 412 bus.<br>23000 lbs.<br>2400 lbs.<br>8800 lbs. | Feeds<br>Building expense<br>Equipment expense<br>Depreciation on work stock<br>Miscellaneous | | $125<br>46<br>15<br>14<br>23 |

**TABLE 12. Budget for suggested system 1 (60-acre farm—1 man, 2 horses) (Continued)**
**Section D. Livestock: Production and disposition of products**

| Kind of Livestock and Product | Production | Disposal | | | | |
|---|---|---|---|---|---|---|
| | | Fed to Livestock | Used in Home | | Sales | |
| | | | Amount | Value | Amount | Value |
| Dairy cows | | | (365 gal.) | | | |
| Whole milk | 30000 lbs. | 2400 lbs. | 3139 lbs. | $66 | 24461 lbs. | $514 |
| Veals | 420 lbs. | | | | 420 lbs. | 34 |
| Cull cows | 2 cows | | | | 2 cows | 48 |
| Pork | 1600 lbs. | | 500 lbs. | 44 | 1100 lbs. | 96 |
| Poultry, Eggs | 900 doz. | 50 doz. set | 150 doz. | 38 | 700 doz. | 175 |
| Fryers | 400 lbs. | | 100 lbs. | 26 | 300 lbs. | 78 |
| Hens | 400 lbs. | | | | 400 lbs. | 72 |
| Total | | | | $174 | | $1017 |

**TABLE 12. Budget for suggested system 1 (60-acre farm—1 man, 2 horses) (Continued)**
**Section E. Summary of receipts and expenses**

| Incomes | | Expenses | |
|---|---|---|---|
| Crops (Section A) | $418 | Crops (Section B) | |
| Livestock and livestock products (Section D) | 1017 | Seeds and plants | 25 |
| Livestock products used in home (Section D) | 174 | Fertilizer and other materials | 156 |
| Garden and truck | 150 | Building expense | 15 |
| | | Equipment expense | 25 |
| Total | $1759 | | |
| | | Livestock (Section C) | |
| | | Feeds purchased | 125 |
| | | Building expense | 46 |
| | | Equipment expense | 15 |
| | | Depreciation on work stock | 14 |
| Net return $1204 | | Miscellaneous | 23 |
| | | General Farm | |
| | | Fence expense | 36 |
| | | Automobile expense | 75 |
| | | Total | $555 |

TABLE 13. Budget for suggested system 2 (60-acre farm—1 man, 2 horses)
Section A. Crops: Acreage, production and disposition

| Crop | Acres | Production | Farm Use | | Sales | |
|---|---|---|---|---|---|---|
| | | | Feed | Seed | Amount | Value |
| Tobacco | 2 | 1900 lbs. | | | 1900 lbs. | $190 |
| Strawberries (harvested) | 2 | 140 crates | | | 140 crates | 420 |
| Strawberries (young) | 1 | | | | | |
| Corn, grain | 10 | 350 bus. | 348.75 bus. | 1.25 bus. | | |
| Corn, stover | 10 | 23000 lbs. | 23000 lbs. | | | |
| Mixed clover hay | 10 | 25000 lbs. | 25000 lbs. | | | |
| Japan clover hay | 1 | 2000 lbs. | 2000 lbs. | | | |
| Japan clover pasture | 1 | Pasture | Pasture | | | |
| Clover and grass | 10 | Pasture | Pasture | | | |
| Rye (young clovers) | 11 | Pasture | Pasture | | | |
| Rye (cover crop) | 1 | | | | | |
| Orchard and truck | 2 | | | | | |
| Lots | 4 | | | | | |
| Woodland | 6 | | | | | |
| Total | | | | | | $610 |

TABLE 13. Budget for suggested system 2 (60-acre farm—1 man, 2 horses) (Continued)
Section B. Crops: Man Labor, horse work and other requirements

| Crop | Man Hrs. | Horse Hrs. | Seeds and Plants | | Fertilizer and Other Materials | | |
|---|---|---|---|---|---|---|---|
| | | | Amount | Value | Kind | Amount | Value |
| Tobacco | 500 | 180 | | | Fertilizer (5-9-4) | 1000 lbs. | $20 |
| | | | | | Canvas | 13 yds. | 1 |
| | | | | | Arsenate of lead | 8 lbs. | 2 |
| | | | | | Building expense | | 10 |
| | | | | | Equipment expense | | 3 |
| Strawberries | 270 | 135 | 4500 plants | $16 | Superphosphate | 200 lbs. | 2 |
| | | | | | Straw | 2 T. | 24 |
| | | | | | Strawberry crates | 140 | 48 |
| | | | | | Contract picking | 140 crates | 112 |
| | | | | | Grading and crating | 140 crates | 28 |
| | | | | | Building expense | | 2 |
| | | | | | Equipment expense | | 6 |
| Corn | 400 | 400 | 1.25 bus. | Farm | Superphosphate | 4000 lbs. | 44 |
| | | | | | Twine | 20 lbs. | 3 |
| | | | | | Equipment expense | | 8 |
| Mixed clover hay | 110 | 120 | 30 lbs. Red clover | 9 | | | |
| | | | 10 lbs. Alsike | 2 | Limestone | 20 T. | 65 |
| | | | 30 lbs. Alfalfa | 7 | Equipment expense | | 6 |
| | | | 50 lbs. Orchard grass | 9 | | | |
| Japan clover hay | 9 | 10 | 8 lbs. Japan clover | 1 | Equipment expense | | 1 |
| Rye (seeding) | 48 | 120 | 18 bus. | 24 | Equipment expense | | 4 |
| Total | 1327 | 960 | | $68 | Fertilizer and other materials | | $349 |
| | | | | | Building expense | | 12 |
| | | | | | Equipment expense | | 28 |

**TABLE 13. Budget for suggested system 2 (60-acre farm—1 man, 2 horses) (Continued)**

**Section C. Livestock: Number, and man labor, horse work, feed and material requirements**

| Livestock | Number | Man Hrs. | Horse Hrs. | Home Grown Feeds | | Purchased Feed and Other Expenses | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Kind | Amount | Kind | Amount | Value |
| Dairy cows | 8 | 1200 | 80 | Corn<br>Mixed clover hay<br>Japan clover hay<br>Corn stover | 128 bus.<br>18000 lbs.<br>2000 lbs.<br>8000 lbs. | Bran and shorts<br>Cottonseed meal<br>Building expense<br>Equipment expense<br>Miscellaneous | 800 lbs.<br>2400 lbs. | $14<br>53<br>24<br>12<br>20 |
| Veals | 5 | 25 | 5 | Whole milk | 2400 lbs. | | | |
| Dairy calves | 2 | 20 | 2 | Whole milk<br>Corn<br>Mixed clover hay | 960 lbs.<br>2 bus.<br>400 lbs. | Bran and shorts<br>Linseed meal<br>Bldg. & miscl. expense | 60 lbs.<br>20 lbs. | 1<br>1<br>1 |
| Dairy heifers | 2 | 20 | 2 | Corn<br>Mixed clover hay<br>Corn stover | 4 bus.<br>1100 lbs.<br>1800 lbs. | Bran and shorts<br>Bldg. & miscl. expense | 200 lbs. | 4<br>1 |
| Poultry | 90 | 360 | 27 | Corn | 106 bus. | Bran and shorts<br>Meat scrap<br>Baby chick feed<br>Oyster shell<br>Building expense<br>Miscellaneous | 1800 lbs.<br>450 lbs.<br>180 lbs.<br>360 lbs. | 32<br>20<br>9<br>4<br>18<br>1 |
| Hogs | 2 | 20 | 4 | Corn | 28 bus. | Tankage<br>Equipm't & miscl. exp. | 80 lbs. | 3<br>1 |
| Work stock | 2 | 90 | 10 | Corn<br>Mixed clover hay<br>Corn stover | 80 bus.<br>5500 lbs.<br>3000 lbs. | Building expense<br>Equipment expense<br>Depreciation<br>Miscellaneous | | 7<br>4<br>14<br>4 |
| Total | | 1735 | 130 | Corn<br>Whole milk<br>Hay<br>Corn stover | 348 bus.<br>3360 lbs.<br>27000 lbs.<br>12800 lbs. | Feeds<br>Building expense<br>Equipment expense<br>Depreciation on work stock<br>Miscellaneous | | $137<br>51<br>16<br>14<br>26 |

TABLE 13. Budget for suggested system 2 (60-acre farm—1 man, 2 horses) (Continued)
Section D. Livestock: Production and disposition of products

| Kind of Livestock and Product | Production | Disposal | | | | |
|---|---|---|---|---|---|---|
| | | Fed to Livestock | Used in Home | | Sales | |
| | | | Amount | Value | Amount | Value |
| Dairy cows | | | (365 gal.) | | | |
| Whole milk | 40000 lbs. | 3360 lbs. | 3140 lbs. | $66 | 33500 lbs. | $704 |
| Veals | 700 lbs. | | 140 lbs. | 11 | 560 lbs. | 45 |
| Cull cows | 2 cows | | | | 2 cull cows | 60 |
| Pork | 400 lbs. | | 400 lbs. | 35 | | |
| Poultry, Eggs | 810 doz. | 45 doz. set | 150 doz. | 38 | 615 doz. | 154 |
| Fryers | 360 lbs. | | 100 lbs. | 26 | 260 lbs. | 68 |
| Hens | 360 lbs. | | | | 360 lbs. | 65 |
| Total | | | | $176 | | $1096 |

TABLE 13. Budget for suggested system 2 (60-acre farm—1 man, 2 horses) (Continued)

Section E. Summary of receipts and expenses

| Incomes | | Expenses | |
|---|---|---|---|
| Crop (Section A) | $610 | Crops (Section B) | |
| Livestock and livestock products (Section D) | 1096 | Seeds and plants | $68 |
| Livestock products used in home (Section D) | 176 | Fertilizer and other materials | 349 |
| Garden and truck | 150 | Building expense | 12 |
| | | Equipment expense | 28 |
| Total | $2032 | | |
| | | Livestock (Section C) | |
| | | Feeds purchased | 137 |
| | | Building expense | 51 |
| | | Equipment expense | 16 |
| | | Depreciation on work stock | 14 |
| | | Miscellaneous | 26 |
| Net return $1220 | | | |
| | | General Farm | |
| | | Fence expense | 36 |
| | | Automobile expense | 75 |
| | | Total | $812 |

TABLE 14. Budget for suggested system 4 (80-acre farm—1 man, 3 horses)
Section A. Crops: Acreage, production and disposition

| Crop | Acres | Production | Farm Use | | Sales | |
|---|---|---|---|---|---|---|
| | | | Feed | Seed | Amount | Value |
| Tobacco | 2 | 1900 lbs. | | | 1900 lbs. | $190 |
| Corn, grain | 16 | 560 bus. | 558 bus. | 2 bus. | | |
| Corn, stover | 5 | 11500 lbs. | 11500 lbs. | | | |
| Soybean hay | 4 | 12000 lbs. | 12000 lbs. | | | |
| Wheat | 11 | 154 bus. | | 13.75 bus. | 140.25 bus. | 182 |
| Mixed clover hay | 11 | 27500 lbs. | 27500 lbs. | | | |
| Clover and grass | 22 | Pasture | Pasture | | | |
| Orchard and truck | 2 | | | | | |
| Lots | 4 | | | | | |
| Woodland | 8 | | | | | |
| Total | | | | | | $372 |

TABLE 14. Budget for suggested system 4 (80-acre farm—1 man, 3 horses) (Continued)
Section B. Crops: Man Labor, horse work and other requirements

| Crop | Man Hrs. | Horse Hrs. | Seeds and Plants | | Fertilizer and Other Materials | | |
|---|---|---|---|---|---|---|---|
| | | | Amount | Value | Kind | Amount | Value |
| Tobacco | 500 | 180 | | | Fertilizer (5-9-4) | 700 lbs. | $14 |
| | | | | | Canvas | 13 yds. | 1 |
| | | | | | Arsenate of lead | 8 lbs. | 2 |
| | | | | | Building expense | | 10 |
| | | | | | Equipment expense | | 6 |
| Corn | 497 | 662 | 2 bus. | Farm | Superphosphate | 5400 lbs. | 59 |
| | | | | | Twine | 10 lbs. | 2 |
| | | | | | Equipment expense | | 12 |
| Soybean hay | 80 | 140 | 5 bus. | $12 | Inoculation | | Farm |
| | | | | | Equipment expense | | 3 |
| Wheat | 165 | 242 | 13.75 bus. | Farm | Contract threshing | 154 bus. | 18 |
| | | | | | Twine | 22 lbs. | 4 |
| | | | | | Equipment expense | | 8 |
| Mixed clover hay | 121 | 132 | 33 lbs. Red clover | 10 | Limestone | 22 T. | 72 |
| | | | 11 lbs. Alsike | 3 | Equipment expense | | 7 |
| | | | 33 lbs. Alfalfa | 8 | | | |
| | | | 55 lbs. Orchard grass | 10 | | | |
| Total | 1363 | 1356 | | $43 | Fertilizer and other materials | | $172 |
| | | | | | Building expense | | 10 |
| | | | | | Equipment expense | | 36 |

**TABLE 14. Budget for suggested system 4 (80-acre farm—1 man, 3 horses) (Continued)**
**Section C. Livestock: Number, and man labor, horse work, feed and material requirements**

| Livestock | Number | Man Hrs. | Horse Hrs. | Home Grown Feeds | | Purchased Feed and Other Expenses | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Kind | Amount | Kind | Amount | Value |
| Dairy cows | 10 | 1500 | 100 | Corn | 160 bus. | Bran and shorts | 1000 lbs. | $18 |
| | | | | Legume hay | 25000 lbs. | Cottonseed meal | 3000 lbs. | 66 |
| | | | | Corn stover | 10000 lbs. | Building expense | | 30 |
| | | | | | | Equipment expense | | 15 |
| | | | | | | Miscellaneous | | 25 |
| Veals | 6 | 30 | 6 | Whole milk | 2880 lbs. | | | |
| Dairy calves | 3 | 30 | 3 | Corn | 3 bus. | Bran and shorts | 90 lbs. | 2 |
| | | | | Legume hay | 600 lbs. | Linseed meal | 30 lbs. | 1 |
| | | | | Whole milk | 1440 lbs. | Bldg. & miscl. expense | | 1 |
| Dairy heifers | 3 | 30 | 3 | Corn | 6 bus. | Bran and shorts | 300 lbs. | 5 |
| | | | | Legume hay | 3000 lbs. | Bldg. & miscl. expense | | 2 |
| Sow and pigs | 1 | 80 | 16 | Corn | 112 bus. | Tankage | 320 lbs. | 12 |
| | | | | | | Equipment expense | | 2 |
| | | | | | | Miscellaneous | | 2 |
| Poultry | 135 | 540 | 40 | Corn | 159 bus. | Meat scrap | 675 lbs. | 30 |
| | | | | | | Bran and shorts | 2700 lbs. | 49 |
| | | | | | | Baby chick feed | 270 lbs. | 14 |
| | | | | | | Oyster shell | 540 lbs. | 5 |
| | | | | | | Building expense | | 27 |
| | | | | | | Miscellaneous | | 1 |
| Work stock | 3 | 135 | 15 | Corn | 120 bus. | Building expense | | 10 |
| | | | | | | Equipment expense | | 6 |
| | | | | Legume hay | 10500 lbs. | Depreciation | | 21 |
| | | | | | | Miscellaneous | | 5 |
| Total | | 2345 | 183 | Corn | 560 bus. | Feeds | | $202 |
| | | | | Corn stover | 10000 lbs. | Building expense | | 69 |
| | | | | Legume hay | 39100 lbs. | Equipment expense | | 23 |
| | | | | Whole milk | 4320 lbs. | Depreciation on work stock | | 21 |
| | | | | | | Miscellaneous | | 34 |

TABLE 14. Budget for suggested system 4 (80-acre farm—1 man, 3 horses) (Continued)
Section D. Livestock: Production and disposition of products

| Kind of Livestock and Product | Production | Disposal | | | | |
|---|---|---|---|---|---|---|
| | | Fed to Livestock | Used in Home | | Sales | |
| | | | Amount | Value | Amount | Value |
| Dairy cows | | | (365 gal.) | | | |
| Whole milk | 50000 lbs. | 4320 lbs. | 3140 lbs. | $66 | 42540 lbs. | $893 |
| Veals | 840 lbs. | | | | 840 lbs. | 67 |
| Cull cows | 3 cows | | | | 3 cows | 72 |
| Pork | 1600 lbs. | | 500 lbs. | 44 | 1100 lbs. | 96 |
| Poultry, Eggs | 1215 doz. | 62 doz. set | 150 doz. | 38 | 1003 doz. | 251 |
| Fryers | 540 lbs. | | 100 lbs. | 26 | 440 lbs. | 114 |
| Hens | 540 lbs. | | | | 540 lbs. | 97 |
| Total | | | | $174 | | $1590 |

**TABLE 14. Budget for suggested system 4 (80-acre farm—1 man, 3 horses) (Continued)**
**Section E. Summary of receipts and expenses**

| Incomes | | Expenses | |
|---|---|---|---|
| Crops (Section A) | $372 | Crops (Section B) | |
| Livestock and livestock products (Section D) | 1590 | Seeds and plants | $43 |
| Livestock products used in home (Section D) | 174 | Fertilizer and other materials | 172 |
| Garden and truck | 150 | Building expense | 10 |
| | | Equipment expense | 36 |
| Total | $2286 | | |
| | | Livestock (Section C) | |
| | | Feeds purchased | 202 |
| | | Building expense | 69 |
| | | Equipment expense | 23 |
| | | Depreciation on work stock | 21 |
| | | Miscellaneous | 34 |
| Net return $1552 | | | |
| | | General Farm | |
| | | Fence expense | 44 |
| | | Automobile expense | 80 |
| | | Total | $734 |

TABLE 15. Budget for suggested system 5 (80-acre farm—1 man, 3 horses)
Section A. Crops: Acreage, production and disposition

| Crop | Acres | Production | Farm Use | | Sales | |
|---|---|---|---|---|---|---|
| | | | Feed | Seed | Amount | Value |
| Tobacco | 4 | 3800 lbs. | | | 3800 lbs. | $380 |
| Strawberries (harvested) | 4 | 280 crates | | | 280 crates | 840 |
| Strawberries (young) | 2 | | | | | |
| Corn, grain | 16 | 560 bus. | 558 bus | 2 bus. | | |
| Corn, stover | 8 | 18400 lbs. | 18400 lbs. | | | |
| Wheat | 8 | 112 bus. | | 10 bus. | 102 bus. | 133 |
| Mixed clover hay | 8 | 20000 lbs. | 20000 lbs. | | | |
| Japan clover hay | 4 | 8000 lbs. | 8000 lbs. | | | |
| Clover and grass | 16 | Pasture | Pasture | | | |
| Rye (Japan clover) | 2 | Pasture | Pasture | | | |
| Rye (cover crop) | 2 | | | | | |
| Orchard and truck | 2 | | | | | |
| Lots | 4 | | | | | |
| Woodland | 10 | | | | | |
| Total | | | | | | $1353 |

**TABLE 15. Budget for suggested system 5 (80-acre farm—1 man, 3 horses) (Continued)**
**Section B. Crops: Man Labor, horse work and other requirements**

| Crop | Man Hrs. | Horse Hrs. | Seeds and Plants | | Fertilizer and Other Materials | | |
|---|---|---|---|---|---|---|---|
| | | | Amount | Value | Kind | Amount | Value |
| Tobacco | 1000 | 360 | | | Fertilizer (5-9-4) | 2000 lbs. | $40 |
| | | | | | Canvas | 27 yds. | 1 |
| | | | | | Arsenate of lead | 16 lbs. | 4 |
| | | | | | Building expense | | 20 |
| | | | | | Equipment expense | | 6 |
| Strawberries | 540 | 270 | 9000 plants | $32 | Superphosphate | 400 lbs. | 4 |
| | | | | | Straw | 4 T. | Farm |
| | | | | | Crates | 280 | 95 |
| | | | | | Contract picking | 280 crates | 224 |
| | | | | | Grading and crating | 280 crates | 56 |
| | | | | | Building expense | | 4 |
| | | | | | Equipment expense | | 12 |
| Corn | 536 | 656 | 2 bus. | Farm | Superphosphate | 4800 lbs. | 53 |
| | | | | | Twine | 16 lbs. | 3 |
| | | | | | Equipment expense | | 12 |
| Wheat | 120 | 176 | 10 bus. | Farm | Contract threshing | 112 bus. | 13 |
| | | | | | Twine | 16 lbs. | 3 |
| | | | | | Equipment expense | | 6 |
| Mixed clover hay | 88 | 96 | 24 lbs. Red clover | 7 | | | |
| | | | 8 lbs. Alsike | 2 | Limestone | 16 T. | 52 |
| | | | 24 lbs. Alfalfa | 6 | Equipment expense | | 5 |
| | | | 40 lbs. Orchard grass | 7 | | | |
| Japan clover hay | 36 | 40 | 16 lbs. Japan clover | 2 | Equipment expense | | 2 |
| Rye (seeding) | 16 | 40 | 6 bus. | 8 | Equipment expense | | 1 |
| Total | 2332 | 1614 | | $64 | Fertilizer and other materials | | $548 |
| | | | | | Building expense | | 24 |
| | | | | | Equipment expense | | 44 |

**TABLE 15. Budget for suggested system 5 (80-acre farm—1 man, 3 horses) (Continued)**
**Section C. Livestock: Number, and man labor, horse work, feed and material requirements**

| Livestock | Number | Man Hrs. | Horse Hrs. | Home Grown Feeds | | Purchased Feed and Other Expenses | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Kind | Amount | Kind | Amount | Value |
| | | | | | | Bran and shorts | 600 lbs. | $11 |
| | | | | Corn | 96 bus. | Cottonseed meal | 1800 lbs. | 40 |
| | | | | Legume hay | 15000 lbs. | Building expense | | 18 |
| Dairy cows | 6 | 900 | 60 | Corn stover | 6000 lbs. | Equipment expense | | 9 |
| | | | | | | Miscellaneous | | 15 |
| Veals | 3 | 15 | 3 | Whole milk | 1440 lbs. | | | |
| | | | | Corn | 2 bus. | Bran and shorts | 60 lbs. | 1 |
| Dairy calves | 2 | 20 | 2 | Whole milk | 960 lbs. | Linseed meal | 20 lbs. | 1 |
| | | | | Legume hay | 400 lbs. | Bldg. & miscl. expense | | 1 |
| Dairy heifers | 2 | 20 | 2 | Corn | 4 bus. | Bran and shorts | 200 lbs. | 4 |
| | | | | Legume hay | 2000 lbs. | Bldg. & miscl. expense | | 1 |
| Sows and pigs | 2 | 160 | 32 | Corn | 208 bus. | Equipment expense | | 3 |
| | | | | Skim-milk | 8800 lbs. | Miscellaneous | | 4 |
| | | | | | | Oyster shell | 400 lbs. | 4 |
| Poultry | 100 | 400 | 30 | Corn | 125 bus. | Baby chick feed | 200 lbs. | 10 |
| | | | | Skim-milk | 13000 lbs. | Building expense | | 20 |
| | | | | | | Miscellaneous | | 1 |
| | | | | | | Building expense | | 10 |
| Work stock | 3 | 135 | 15 | Corn | 120 bus. | Equipment expense | | 6 |
| | | | | Legume hay | 10500 lbs. | Depreciation | | 21 |
| | | | | | | Miscellaneous | | 5 |
| | | | | Corn | 555 bus. | Feeds | | $71 |
| | | | | Whole milk | 2400 lbs. | Building expense | | 49 |
| Total | | 1645 | 143 | Skim-milk | 21800 lbs. | Equipment expense | | 18 |
| | | | | Legume hay | 27900 lbs. | Depreciation on work stock | | 21 |
| | | | | Corn stover | 6000 lbs. | Miscellaneous | | 26 |

TABLE 15. Budget for suggested system 5 (80-acre farm—1 man, 3 horses) (Continued)
Section D. Livestock: Production and disposition of products

| Kind of Livestock and Product | Production | Disposal | | | | |
|---|---|---|---|---|---|---|
| | | Fed to Livestock | Used in Home | | Sales | |
| | | | Amount | Value | Amount | Value |
| Dairy cows | | | | | | |
| Whole milk | 30000 lbs. | 2400 lbs. | (365 gal.) 3140 lbs. | $66 | 1081 lbs. B. F. | $411 |
| Veals | 420 lbs. | | | | 420 lbs. | 34 |
| Cull cows | 2 cows | | | | 2 cows | 48 |
| Pork | 3200 lbs. | | 500 lbs. | 44 | 2700 lbs. | 236 |
| Poultry, Eggs | 900 doz. | 50 doz. set | 150 doz. | 38 | 700 doz. | 175 |
| Fryers | 400 lbs. | | 100 lbs. | 26 | 300 lbs. | 78 |
| Hens | 400 lbs. | | | | 400 lbs. | 72 |
| Total | | | | $174 | | $1054 |

TABLE 15. Budget for suggested system 5 (80-acre farm—1 man, 3 horses) (Continued)
Section E. Summary of receipts and expenses

| Incomes | | Expenses | |
|---|---|---|---|
| Crops (Section A) | $1353 | Crops (Section B) | |
| Livestock and livestock products (Section D) | 1054 | Seeds and plants | $64 |
| Livestock products used in home (Section D) | 174 | Fertilizer and other materials | 548 |
| Garden and truck | 150 | Building expense | 24 |
| | | Equipment expense | 44 |
| Total | $2731 | | |
| | | Livestock (Section C) | |
| | | Feeds purchased | 71 |
| | | Building expense | 49 |
| | | Equipment expense | 18 |
| | | Depreciation on work stock | 21 |
| | | Miscellaneous | 26 |
| Net return $1742 | | | |
| | | General Farm | |
| | | Fence expense | 44 |
| | | Automobile expense | 80 |
| | | Total | $989 |

**TABLE 16. Budget for suggested system 6 (100-acre farm—2 men, 4 horses)**
**Section A. Crops: Acreage, production and disposition**

| Crop | Acres | Production | Farm Use | | Sales | |
|---|---|---|---|---|---|---|
| | | | Feed | Seed | Amount | Value |
| Tobacco | 6 | 5700 lbs. | | | 5700 lbs. | $570 |
| Corn, grain | 20 | 700 bus. | 697.5 bus. | 2.5 bus. | | |
| Corn, stover | 6 | 13800 lbs. | 13800 lbs. | | | |
| Wheat | 14 | 196 bus. | 19 bus. | 17.5 bus. | 159.5 bus. | 207 |
| Soybean hay | 2 | 6000 lbs. | 6000 lbs. | | | |
| Mixed clover hay | 14 | 35000 lbs. | 35000 lbs. | | | |
| Clover and grass | 28 | Pasture | Pasture | | | |
| Orchard and truck | 2.5 | | | | | |
| Lots | 4.5 | | | | | |
| Woodland | 9 | | | | | |
| Total | | | | | | $777 |

TABLE 16. Budget for suggested system 6 (100-acre farm—2 men, 4 horses) (Continued)
Section B. Crops: Man Labor, horse work and other requirements

| Crop | Man Hrs. | Horse Hrs. | Seeds and Plants | | Fertilizer and Other Materials | | |
|---|---|---|---|---|---|---|---|
| | | | Amount | Value | Kind | Amount | Value |
| Tobacco | 1500 | 540 | | | Fertilizer (5-9-4)<br>Canvas<br>Arsenate of lead<br>Building expense<br>Equipment expense | 2100 lbs.<br>40 yds.<br>24 lbs. | $42<br>2<br>6<br>30<br>9 |
| Corn | 618 | 828 | 2.5 bus. | Farm | Superphosphate<br>Twine<br>Equipment expense | 6800 lbs.<br>12 lbs. | 75<br>2<br>15 |
| Wheat | 210 | 308 | 17.5 bus. | Farm | Contract threshing<br>Twine<br>Equipment expense | 196 bus.<br>28 lbs. | 24<br>4<br>10 |
| Soybean hay | 40 | 70 | 2.5 bus. | $6 | Inoculation<br>Equipment expense | | Farm<br>2 |
| Mixed clover hay | 154 | 168 | 42 lbs. Red Clover<br>14 lbs. Alsike<br>42 lbs. Alfalfa<br>70 lbs. Orchard grass | 13<br>4<br>10<br>13 | Limestone<br>Equipment expense | 28 T. | 91<br>8 |
| Total | 2522 | 1914 | | $46 | Fertilizer and other materials<br>Building expense<br>Equipment expense | | $246<br>30<br>44 |

TABLE 16. Budget for suggested system 6 (100-acre farm—2 men, 4 horses) (Continued)
Section C. Livestock: Number, and man labor, horse work, feed and material requirements

| Livestock | Number | Man Hrs. | Horse Hrs. | Home Grown Feeds | | Purchased Feed and Other Expenses | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Kind | Amount | Kind | Amount | Value |
| Dairy cows | 10 | 1500 | 100 | Corn | 160 bus. | Bran and shorts | 1000 lbs. | $18 |
| | | | | Legume hay | 25000 lbs. | Cottonseed meal | 3000 lbs. | 66 |
| | | | | Corn stover | 10000 lbs. | Building expense | | 30 |
| | | | | | | Equipment expense | | 15 |
| | | | | | | Miscellaneous | | 25 |
| Veals | 6 | 30 | 6 | Whole milk | 2880 lbs. | | | |
| Dairy calves | 3 | 30 | 3 | Corn | 3 bus. | Bran and shorts | 90 lbs. | 2 |
| | | | | Legume hay | 600 lbs. | Linseed meal | 30 lbs. | 1 |
| | | | | Whole milk | 1440 lbs. | Bldg. & miscl. expense | | 1 |
| Dairy heifers | 3 | 30 | 3 | Corn | 6 bus. | Bran and shorts | 300 lbs. | 5 |
| | | | | Legume hay | 3000 lbs. | Bldg. & miscl. expense | | 2 |
| Sows and pigs | 2 | 160 | 32 | Corn | 224 bus. | Tankage | 640 lbs. | 25 |
| | | | | | | Equipment expense | | 3 |
| | | | | | | Miscellaneous | | 4 |
| Poultry | 140 | 560 | 42 | Corn | 145 bus. | Bran and shorts | 2800 lbs. | 50 |
| | | | | Wheat | 19 bus. | Meat scrap | 700 lbs. | 32 |
| | | | | | | Baby chick feed | 280 lbs. | 14 |
| | | | | | | Oyster shell | 560 lbs. | 6 |
| | | | | | | Building expense | | 28 |
| | | | | | | Miscellaneous | | 1 |
| Work stock | 4 | 180 | 20 | Corn | 160 bus. | Building expense | | 14 |
| | | | | Legume hay | 14000 lbs. | Equipment expense | | 8 |
| | | | | | | Depreciation | | 28 |
| | | | | | | Miscellaneous | | 7 |
| Total | | 2490 | 206 | Corn | 698 bus. | Feeds | | $219 |
| | | | | Whole milk | 4320 lbs. | Building expense | | 74 |
| | | | | Legume hay | 40600 lbs. | Equipment expense | | 26 |
| | | | | Corn stover | 10000 lbs. | Depreciation on work stock | | 28 |
| | | | | Wheat | 19 bus. | Miscellaneous | | 38 |

**TABLE 16. Budget for suggested system 6 (100-acre farm—2 men, 4 horses) (Continued)**
**Section D. Livestock: Production and disposition of products**

| Kind of Livestock and Product | Production | Disposal | | | | |
|---|---|---|---|---|---|---|
| | | Fed to Livestock | Used in Home | | Sales | |
| | | | Amount | Value | Amount | Value |
| Dairy cows | | | (450 gal.) | | | |
| Whole milk | 50000 lbs. | 4320 lbs. | 3870 lbs. | $81 | 41810 lbs. | $878 |
| Veals | 840 lbs. | | | | 840 lbs. | 67 |
| Cull cows | 3 cows | | | | 3 cows | 72 |
| Pork | 3200 lbs. | | 600 lbs. | 52 | 2600 lbs. | 228 |
| Poultry, Eggs | 1260 doz. | 70 doz. set | 180 doz. | 45 | 1010 doz. | 252 |
| Fryers | 560 lbs. | | 125 lbs. | 32 | 435 lbs. | 113 |
| Hens | 560 lbs. | | | | 560 lbs. | 101 |
| Total | | | | $210 | | $1711 |

**TABLE 16. Budget for suggested system 6 (100-acre farm—2 men, 4 horses) (Continued)**
**Section E. Summary of receipts and expenses**

| Incomes | | Expenses | |
|---|---|---|---|
| Crops (Section A) | $777 | Crops (Section B) | |
| Livestock and livestock products (Section D) | 1711 | Seeds and plants | $46 |
| Livestock products used in home (Section D) | 210 | Fertilizer and other materials | 246 |
| Garden and truck | 250 | Building expense | 30 |
| | | Equipment expense | 44 |
| Total | $2948 | | |
| | | Livestock (Section C) | |
| | | Feeds purchased | 219 |
| | | Building expense | 74 |
| | | Equipment expense | 26 |
| | | Depreciation on work stock | 28 |
| | | Miscellaneous | 38 |
| Net return $2057 | | | |
| | | General Farm | |
| | | Fence expense | 50 |
| | | Automobile expense | 90 |
| | | Total | $891 |

**TABLE 17. Budget for suggested system 7 (100-acre farm—2 men, 4 horses)**
**Section A. Crops: Acreage, production and disposition**

| Crop | Acres | Production | Farm Use | | Sales | |
|---|---|---|---|---|---|---|
| | | | Feed | Seed | Amount | Value |
| Tobacco | 5 | 4750 lbs. | | | 4750 lbs. | $475 |
| Strawberries (harvested) | 5 | 350 crates | | | 350 crates | 1050 |
| Strawberries (young) | 2.5 | | | | | |
| Corn, grain | 16 | 560 bus. | 558 bus. | 2 bus. | | |
| Corn, stover | 16 | 36800 lbs. | 36800 lbs. | | | |
| Wheat | 16 | 224 bus. | | 20 bus. | 204 bus. | 265 |
| Mixed clover hay | 16 | 40000 lbs. | 40000 lbs. | | | |
| Clover and grass | 16 | Pasture | Pasture | | | |
| Pasture mixture | 5 | Pasture | Pasture | | | |
| Rye (pasture mixture) | 2.5 | Pasture | Pasture | | | |
| Rye (cover crop) | 2.5 | | | | | |
| Orchard and truck | 2.5 | | | | | |
| Lots | 4.5 | | | | | |
| Woodland | 9 | | | | | |
| Total | | | | | | $1790 |

TABLE 17. Budget for suggested system 7 (160-acre farm—2 men, 4 horses) (Continued)
Section B. Crops: Man Labor, horse work and other requirements

| Crop | Man Hrs. | Horse Hrs. | Seeds and Plants | | | Fertilizer and Other Materials | | |
|---|---|---|---|---|---|---|---|---|
| | | | Amount | | Value | Kind | Amount | Value |
| Tobacco | 1250 | 450 | | | | Fertilizer (5-9-4) | 2500 lbs. | $50 |
| | | | | | | Canvas | 33 yds. | 2 |
| | | | | | | Arsenate of lead | 20 lbs. | 5 |
| | | | | | | Building expense | | 25 |
| | | | | | | Equipment expense | | 8 |
| Strawberries | 675 | 338 | 11250 | plants | $39 | Superphosphate | 500 lbs. | 5 |
| | | | | | | Straw | 5 T. | Farm |
| | | | | | | Strawberry crates | 350 | 119 |
| | | | | | | Contract picking | 350 crates | 280 |
| | | | | | | Grading and crating | | 70 |
| | | | | | | Building expense | | 2 |
| | | | | | | Equipment expense | | 8 |
| Corn | 640 | 640 | 2 | bus. | Farm | Superphosphate | 6400 lbs. | 70 |
| | | | | | | Twine | 32 lbs. | 5 |
| | | | | | | Equipment expense | | 13 |
| Wheat | 240 | 352 | 20 | bus. | Farm | Contract threshing | 224 bus. | 27 |
| | | | | | | Twine | 32 lbs. | 5 |
| | | | | | | Equipment expense | | 13 |
| Mixed clover hay | 176 | 192 | 48 | lbs. Red clover | 14 | | | |
| | | | 16 | lbs. Alsike | 4 | Limestone | 32 T. | 104 |
| | | | 48 | lbs. Alfalfa | 11 | Equipment expense | | 10 |
| | | | 80 | lbs. Orchard grass | 14 | | | |
| Rye (Pasture mixture) | 12 | 25 | 3.75 | bus. Rye | 5 | | | |
| | | | 12 | lbs. Japan clover | 1 | | | |
| | | | 12 | lbs. Orchard grass | 2 | | | |
| | | | 8 | lbs. Redtop | 2 | Equipment expense | | 1 |
| Rye (cover crop) | 10 | 25 | 3.75 | bus. Rye | 5 | Equipment expense | | 1 |
| Total | 3003 | 2016 | | | $97 | Fertilizer and other materials | | $742 |
| | | | | | | Building expense | | 27 |
| | | | | | | Equipment expense | | 54 |

TABLE 17. Budget for suggested system 7 (100-acre farm—2 men, 4 horses) (Continued)
Section C. Livestock: Number, and man labor, horse work, feed and material requirements

| Livestock | Number | Man Hrs. | Horse Hrs. | Home Grown Feeds | | Purchased Feed and Other Expenses | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Kind | Amount | Kind | Amount | Value |
| Dairy cows | 10 | 1500 | 100 | Corn<br>Legume hay<br>Corn stover | 160 bus.<br>25000 lbs.<br>10000 lbs. | Bran and shorts<br>Cottonseed meal<br>Building expense<br>Equipment expense<br>Miscellaneous | 1000 lbs.<br>3000 lbs. | $18<br>66<br>30<br>15<br>25 |
| Veals | 6 | 30 | 6 | Whole milk | 2880 lbs. | | | |
| Dairy calves | 3 | 30 | 3 | Corn<br>Whole milk<br>Legume hay | 3 bus.<br>1440 lbs.<br>600 lbs. | Bran and shorts<br>Linseed meal<br>Bldg. & miscl. expense | 90 lbs.<br>30 lbs. | 2<br>1<br>1 |
| Dairy heifers | 3 | 30 | 3 | Corn<br>Legume hay<br>Corn stover | 6 bus.<br>2400 lbs.<br>1200 lbs. | Bran and shorts<br>Bldg. & miscl. expense | 300 lbs. | 5<br>2 |
| Sow and pigs | 1 | 80 | 16 | Corn | 112 bus. | Tankage<br>Equipment expense<br>Miscellaneous | 320 lbs. | 12<br>2<br>2 |
| Poultry | 100 | 400 | 30 | Corn | 118 bus. | Bran and shorts<br>Meat scrap<br>Baby chick feed<br>Oyster shell<br>Building expense<br>Miscellaneous | 2000 lbs.<br>500 lbs.<br>200 lbs.<br>400 lbs. | 36<br>22<br>10<br>4<br>20<br>1 |
| Work stock | 4 | 180 | 20 | Corn<br>Legume hay<br>Corn stover | 160 bus.<br>12000 lbs.<br>4000 lbs. | Building expense<br>Equipment expense<br>Depreciation<br>Miscellaneous | | 14<br>8<br>28<br>7 |
| Total | | 2250 | 178 | Corn<br>Whole milk<br>Legume hay<br>Corn stover | 559 bus.<br>4320 lbs.<br>40000 lbs.<br>15200 lbs. | Feeds<br>Building expense<br>Equipment expense<br>Depreciation on work stock<br>Miscellaneous | | $176<br>66<br>25<br>28<br>36 |

TABLE 17. Budget for suggested system 7 (100-acre farm—2 men, 4 horses) (Continued)
Section D. Livestock: Production and disposition of products

| Kind of Livestock and Product | Production | Disposal | | | | |
|---|---|---|---|---|---|---|
| | | Fed to Livestock | Used in Home | | Sales | |
| | | | Amount | Value | Amount | Value |
| Dairy cows | | | | | | |
| Whole milk | 50000 lbs. | 4320 lbs. | (450 gal.) 3870 lbs. | $81 | 41810 lbs. | $878 |
| Veals | 840 lbs. | | | | 840 lbs. | 67 |
| Cull cows | 3 cows | | | | 3 cows | 72 |
| Pork | 1600 lbs. | | 600 lbs. | 52 | 1000 lbs. | 88 |
| Poultry, Eggs | 900 doz. | 50 doz. set | 180 doz. | 45 | 670 doz. | 168 |
| Fryers | 400 lbs. | | 125 lbs. | 32 | 275 lbs. | 72 |
| Hens | 400 lbs. | | | | 400 lbs. | 72 |
| Total | | | | $210 | | $1417 |

TABLE 17. Budget for suggested system 7 (100-acre farm—2 men, 4 horses) (Continued)
Section E. Summary of receipts and expenses

| Incomes | | Expenses | |
|---|---|---|---|
| Crops (Section A) | $1790 | Crops (Section B) | |
| Livestock and livestock products (Section D) | 1417 | Seeds and plants | $97 |
| Livestock products used in home (Section D) | 210 | Fertilizer and other materials | 742 |
| Garden and truck | 250 | Building expense | 27 |
| | | Equipment expense | 54 |
| Total | $3667 | | |
| | | Livestock (Section C) | |
| | | Feeds purchased | 176 |
| | | Building expense | 66 |
| | | Equipment expense | 25 |
| | | Depreciation on work stock | 23 |
| | | Miscellaneous | 36 |
| Net return $2276 | | | |
| | | General Farm | |
| | | Fence expense | 50 |
| | | Automobile expense | 90 |
| | | Total | $1391 |

TABLE 18. Budget for suggested system 8 (150-acre farm—2 men, 4 horses)
Section A. Crops: Acreage, production and disposition

| Crop | Acres | Production | Farm Use | | Sales | |
|---|---|---|---|---|---|---|
| | | | Feed | Seed | Amount | Value |
| Tobacco | 5 | 4750 lbs. | | | 4750 lbs. | $475 |
| Corn, grain | 21 | 735 bus. | 732.4 bus. | 2.6 bus. | | |
| Corn, stover | 21 | 48300 lbs. | 48300 lbs. | | | |
| Wheat | 26 | 364 bus. | | 32.5 bus. | 331.5 bus. | 431 |
| Mixed clover hay | 26 | 65000 lbs. | 65000 lbs. | | | |
| Clover and grass | 52 | Pasture | Pasture | | | |
| Orchard and truck | 3 | | | | | |
| Lots | 6 | | | | | |
| Woodland | 11 | | | | | |
| Total | | | | | | $906 |

**TABLE 18. Budget for suggested system 8 (150-acre farm—2 men, 4 horses) (Continued)**
**Section B. Crops: Man Labor, horse work and other requirements**

| Crop | Man Hrs. | Horse Hrs. | Seeds and Plants | | Fertilizer and Other Materials | | |
|---|---|---|---|---|---|---|---|
| | | | Amount | Value | Kind | Amount | Value |
| Tobacco | 1250 | 450 | | | Fertilizer (5-9-4)<br>Canvas<br>Arsenate of lead<br>Building expense<br>Equipment expense | 2500 lbs.<br>33 yds.<br>20 lbs. | $50<br>2<br>5<br>25<br>8 |
| Corn | 840 | 840 | 2.6 bus. | Farm | Superphosphate<br>Twine<br>Equipment expense | 8400 lbs.<br>42 lbs. | 92<br>7<br>16 |
| Wheat | 390 | 572 | 32.5 bus. | Farm | Contract threshing<br>Twine<br>Equipment expense | 364 bus.<br>52 lbs. | 44<br>3<br>20 |
| Mixed clover hay | 286 | 312 | 78 lbs. Red clover<br>26 lbs. Alsike<br>78 lbs. Alfalfa<br>130 lbs. Orchard grass | $23<br>6<br>18<br>23 | Limestone<br>Equipment expense | 52 T. | 169<br>16 |
| Total | 2766 | 2174 | | $70 | Fertilizer and other materials<br>Building expense<br>Equipment expense | | $377<br>25<br>60 |

TABLE 18. Budget for suggested system 8 (150-acre farm—2 men, 4 horses) (Continued)
Section C. Livestock: Number, and man labor, horse work, feed and material requirements

| Livestock | Number | Man Hrs. | Horse Hrs. | Home Grown Feeds | | Purchased Feed and Other Expenses | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Kind | Amount | Kind | Amount | Value |
| | | | | | | Bran and shorts | 1200 lbs. | $22 |
| | | | | Corn | 192 bus. | Cottonseed meal | 3600 lbs. | 79 |
| Dairy cows | 12 | 1800 | 120 | Legume hay | 30000 lbs. | Building expense | | 36 |
| | | | | Corn stover | 12000 lbs. | Equipment expense | | 18 |
| | | | | | | Miscellaneous | | 30 |
| Veals | 8 | 40 | 8 | Whole milk | 3840 lbs. | | | |
| | | | | Skim-milk | 3600 lbs. | | | |
| Dairy calves | 3 | 30 | 3 | Whole milk | 150 lbs. | Bldg. & miscl. expense | | 1 |
| | | | | Legume hay | 600 lbs. | | | |
| Dairy heifers | 3 | 30 | 3 | Corn | 6 bus. | Bran and shorts | 300 lbs. | 5 |
| | | | | Legume hay | 3000 lbs. | Bldg. & miscl. expense | | 2 |
| | | | | Corn | 56 bus. | Oats | 38 bus. | 25 |
| Sheep | 50 | 300 | 75 | Legume hay | 16250 lbs. | Building expense | | 15 |
| | | | | | | Miscellaneous | | 1 |
| Sow and pigs | 1 | 80 | 16 | Corn | 104 bus. | Equipment expense | | 2 |
| | | | | Skim-milk | 4400 lbs. | Miscellaneous | | 2 |
| | | | | | | Baby chick feed | 340 lbs. | 17 |
| Poultry | 170 | 680 | 51 | Corn | 212 bus. | Oyster shell | 680 lbs. | 7 |
| | | | | Skim-milk | 22100 lbs. | Building expense | | 34 |
| | | | | | | Miscellaneous | | 2 |
| | | | | | | Building expense | | 14 |
| Work stock | 4 | 180 | 20 | Corn | 160 bus. | Equipment expense | | 8 |
| | | | | Legume hay | 14000 lbs. | Depreciation | | 28 |
| | | | | | | Miscellaneous | | 7 |
| | | | | Corn | 730 bus. | Feeds | | $155 |
| | | | | Whole milk | 3990 lbs. | Building expense | | 101 |
| Total | | 3140 | 296 | Skim-milk | 30100 lbs. | Equipment expense | | 28 |
| | | | | Legume hay | 63850 lbs. | Depreciation on work stock | | 28 |
| | | | | Corn stover | 12000 lbs. | Miscellaneous | | 43 |

**TABLE 18. Budget for suggested system 8 (150-acre farm—2 men, 4 horses) (Continued)**
**Section D. Livestock: Production and disposition of products**

| Kind of Livestock and Product | Production | Disposal | | | | |
|---|---|---|---|---|---|---|
| | | Fed to Livestock | Used in Home | | Sales | |
| | | | Amount | Value | Amount | Value |
| Dairy cows | | | (600 gal.) | | | |
| Whole milk | 60000 lbs. | 3990 lbs. | 5160 lbs. | $108 | 2288 lbs. B. F. | $869 |
| Veals | 1120 lbs. | | | | 1120 lbs. | 90 |
| Cull cows | 3 cows | | | | 3 cows | 72 |
| Sheep | | | | | | |
| Lambs | 3500 lbs. | | | | 3500 lbs. | 350 |
| Old sheep | 550 lbs. | | | | 550 lbs. | 16 |
| Wool | 350 lbs. | | | | 350 lbs. | 126 |
| Pork | 1600 lbs. | | 800 lbs. | 70 | 800 lbs. | 70 |
| Poultry, Eggs | 1350 doz. | 75 doz. set | 225 doz. | 56 | 1050 doz. | 262 |
| Fryers | 600 lbs. | | 175 lbs. | 46 | 425 lbs. | 110 |
| Hens | 600 lbs. | | | | 600 lbs. | 108 |
| Total | | | | $280 | | $2073 |

**TABLE 18. Budget for suggested system 8 (150-acre farm—2 men, 4 horses) (Continued)**
**Section E. Summary of receipts and expenses**

| Incomes | | Expenses | |
|---|---|---|---|
| Crops (Section A) | $906 | Crops (Section B) | |
| Livestock and livestock products (Section D) | 2073 | Seeds and plants | $70 |
| Livestock products used in home (Section D) | 280 | Fertilizer and other materials | 377 |
| Garden and truck | 300 | Building expense | 25 |
| | | Equipment expense | 60 |
| Total | $3559 | Livestock (Section C) | |
| | | Feeds purchased | 155 |
| | | Building expense | 101 |
| | | Equipment expense | 28 |
| | | Depreciation on work stock | 28 |
| | | Miscellaneous | 43 |
| Net return $2499 | | General Farm | |
| | | Fence expense | 68 |
| | | Automobile expense | 105 |
| | | Total | $1060 |

TABLE 19. Budget for suggested system 9 (150-acre farm—2 men, 4 horses)
Section A. Crops: Acreage, production and disposition

| Crop | Acres | Production | Farm Use | | Sales | |
|---|---|---|---|---|---|---|
| | | | Feed | Seed | Amount | Value |
| Tomatoes | 5 | 875 bus. | | | 875 bus. | $350 |
| Strawberries (harvested) | 5 | 350 crates | | | 350 crates | 1050 |
| Strawberries (young) | 2.5 | | | | | |
| Corn, grain | 22 | 770 bus. | 767.25 bus. | 2.75 bus. | | |
| Corn, stover | 22 | 50600 lbs. | 50600 lbs. | | | |
| Wheat | 24.5 | 343 bus. | | 30.5 bus. | 312.5 bus. | 406 |
| Mixed clover hay | 22 | 55000 lbs. | 55000 lbs. | | | |
| Clover and grass | 49 | Pasture | Pasture | | | |
| Rye (cover crop) | 2.5 | | | | | |
| Orchard and truck | 3 | | | | | |
| Lots | 6 | | | | | |
| Woodland | 11 | | | | | |
| Total | | | | | | $1806 |

TABLE 19. Budget for suggested system 9 (150-acre farm—2 men, 4 horses) (Continued)
Section B. Crops: Man Labor, horse work and other requirements

| Crop | Man Hrs. | Horse Hrs. | Seeds and Plants | | Fertilizer and Other Materials | | |
|---|---|---|---|---|---|---|---|
| | | | Amount | Value | Kind | Amount | Value |
| Tomatoes | 800 | 600 | 10 oz. | $2 | Superphosphate | 2500 lbs. | $28 |
| | | | | | Canvas | 30 yds. | 2 |
| | | | | | Equipment expense | | 8 |
| Strawberries | 675 | 338 | 11250 plants | | Superphosphate | 500 lbs. | 6 |
| | | | | | Straw | 5 T. | Farm |
| | | | | | Strawberry crates | 350 | 119 |
| | | | | | Contract picking | 350 crates | 280 |
| | | | | | Grading and crating | 350 crates | 70 |
| | | | | | Building expense | | 2 |
| | | | | | Equipment expense | | 8 |
| Corn | 880 | 880 | 2.75 bus. | Farm | Superphosphate | 8800 lbs. | 97 |
| | | | | | Twine | 44 lbs. | 7 |
| | | | | | Equipment expense | | 16 |
| Wheat | 368 | 539 | 30.5 bus. | Farm | Contract threshing | 343 bus. | 41 |
| | | | | | Twine | 49 lbs. | 8 |
| | | | | | Equipment expense | | 18 |
| Mixed clover hay | 242 | 264 | 66 lbs. Red clover | $20 | Limestone | 44 T. | 143 |
| | | | 22 lbs. Alsike | 6 | Equipment expense | | 15 |
| | | | 66 lbs. Alfalfa | 15 | | | |
| | | | 110 lbs. Orchard grass | 20 | | | |
| Pasture mixture (Seeded in wheat) | 2.5 | | 12 lbs. Japan clover | 1 | Equipment expense | | 1 |
| | | | 12 lbs. Orchard grass | 2 | | | |
| | | | 8 lbs. Redtop | 2 | | | |
| Rye (cover crop) | 10 | 25 | 3.75 bus. Rye | 5 | | | |
| Total | 2978 | 2646 | | $112 | Fertilizer and other materials | | $801 |
| | | | | | Building expense | | 2 |
| | | | | | Equipment expense | | 66 |

**TABLE 19. Budget for suggested system 9 (150-acre farm—2 men, 4 horses) (Continued)**
**Section C. Livestock: Number, and man labor, horse work, feed and material requirements**

| Livestock | Number | Man Hrs. | Horse Hrs. | Home Grown Feeds | | Purchased Feed and Other Expenses | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Kind | Amount | Kind | Amount | Value |
| Dairy cows | 15 | 2250 | 150 | Corn<br>Legume hay<br>Corn stover | 240 bus.<br>37500 lbs.<br>15000 lbs. | Bran and shorts<br>Cottonseed meal<br>Building expense<br>Equipment expense<br>Miscellaneous | 1500 lbs.<br>4500 lbs. | $27<br>99<br>45<br>22<br>38 |
| Veals | 10 | 50 | 10 | Whole milk | 4800 lbs. | | | |
| Dairy calves | 4 | 40 | 4 | Corn<br>Whole milk<br>Legume hay | 4 bus.<br>1920 lbs.<br>800 lbs. | Bran and shorts<br>Linseed meal<br>Bldg. & miscl. expense | 120 lbs.<br>40 lbs. | 2<br>1<br>2 |
| Dairy heifers | 4 | 40 | 4 | Corn<br>Legume hay<br>Corn stover | 8 bus.<br>3600 lbs.<br>800 lbs. | Bran and shorts<br>Building expense<br>Miscellaneous | 400 lbs. | 7<br>2<br>1 |
| Sows and pigs | 2 | 160 | 32 | Corn | 224 bus. | Tankage<br>Equipment expense<br>Miscellaneous | 640 lbs. | 25<br>3<br>4 |
| Poultry | 110 | 440 | 33 | Corn | 130 bus. | Bran and shorts<br>Meat scrap<br>Baby chick feed<br>Oyster shell<br>Building expense<br>Miscellaneous | 2200 lbs.<br>550 lbs.<br>220 lbs.<br>440 lbs. | 40<br>25<br>11<br>4<br>22<br>1 |
| Work stock | 4 | 180 | 20 | Corn<br>Legume hay<br>Corn stover | 160 bus.<br>13100 lbs.<br>1800 lbs. | Building expense<br>Equipment expense<br>Depreciation<br>Miscellaneous | | 14<br>8<br>28<br>7 |
| Total | | 3220 | 259 | Corn<br>Whole milk<br>Legume hay<br>Corn stover | 766 bus.<br>6720 lbs.<br>55000 lbs.<br>17600 lbs. | Feeds<br>Building expense<br>Equipment expense<br>Depreciation on work stock<br>Miscellaneous | | $241<br>84<br>33<br>28<br>52 |

TABLE 19. Budget for suggested system 9 (150-acre farm—2 men, 4 horses) (Continued)
Section D. Livestock: Production and disposition of products

| Kind of Livestock and Product | Production | Disposal | | | | |
|---|---|---|---|---|---|---|
| | | Fed to Livestock | Used in Home | | Sales | |
| | | | Amount | Value | Amount | Value |
| Dairy cows | | | (600 gal.) | | | |
| Whole milk | 75000 lbs. | 6720 lbs. | 5160 lbs. | $108 | 63120 lbs. | $1326 |
| Veals | 1400 lbs. | | | | 1400 lbs. | 112 |
| Cull cows | 4 cows | | | | 4 cows | 96 |
| Pork | 3200 lbs. | | 800 lbs. | 70 | 2400 lbs. | 210 |
| Poultry, Eggs | 990 doz. | 55 doz. set | 225 doz. | 56 | 710 doz. | 178 |
| Fryers | 440 lbs. | | 175 lbs. | 46 | 265 lbs. | 69 |
| Hens | 440 lbs. | | | | 440 lbs. | 79 |
| | | | | | | $2070 |
| Total | | | | $280 | | |

TABLE 19. Budget for suggested system 9 (150-acre farm—2 men, 4 horses) (Continued)
Section E. Summary of receipts and expenses

| Incomes | | Expenses | |
|---|---|---|---|
| Crops (Section A) | $1806 | Crops (Section B) | |
| Livestock and livestock products (Section D) | 2070 | Seeds and plants | $112 |
| Livestock products used in home (Section D) | 280 | Fertilizer and other materials | 801 |
| Garden and truck | 300 | Building expense | 2 |
| | | Equipment expense | 66 |
| Total | $4456 | | |
| | | Livestock (Section C) | |
| | | Feeds purchased | 241 |
| | | Building expense | 84 |
| | | Equipment expense | 33 |
| | | Depreciation on work stock | 28 |
| | | Miscellaneous | 52 |
| Net return $2864 | | | |
| | | General Farm | |
| | | Fence expenses | 68 |
| | | Automobile expenses | 105 |
| | | Total | $1592 |

TABLE 20. Budget for suggested system 10 (200-acre farm—3 men, 6 horses)
Section A. Crops: Acreage, production and disposition

| Crop | Acres | Production | Farm Use | | Sales | |
|---|---|---|---|---|---|---|
| | | | Feed | Seed | Amount | Value |
| Tobacco | 10 | 9500 lbs. | | | 9500 lbs. | $950 |
| Corn, grain | 33 | 1155 bus. | 1149.6 bus. | 5.4 bus. | | |
| Corn, stover | 3 | 6900 lbs. | 6900 lbs. | | | |
| Corn, silage | 7 | 49 T. | 49 T. | | | |
| Wheat | 20 | 280 bus. | | 25.0 bus. | 255 bus. | 332 |
| Mixed clover hay | 25 | 62500 lbs. | 62500 lbs. | | | |
| Rye (pasture mixture) | 10 | Pasture | Pasture | | | |
| Clover and grass | 65 | Pasture | Pasture | | | |
| Orchard and truck | 5 | | | | | |
| Lots | 7 | | | | | |
| Woodland | 18 | | | | | |
| Total | | | | | | $1282 |

TABLE 20. Budget for suggested system 10 (200-acre farm—3 men, 6 horses) (Continued)
Section B. Crops: Man Labor, horse work and other requirements

| Crop | Man Hrs. | Horse Hrs. | Seeds and Plants | | Fertilizer and Other Materials | | |
|---|---|---|---|---|---|---|---|
| | | | Amount | Value | Kind | Amount | Value |
| Tobacco | 2500 | 900 | | | Fertilizer (5-9-4) | 5000 lbs. | $100 |
| | | | | | Canvas | 67 yds. | 3 |
| | | | | | Arsenate of lead | 40 lbs. | 10 |
| | | | | | Building expense | | 50 |
| | | | | | Equipment expense | | 15 |
| Corn | 930 | 1380 | 4.12 bus. | Farm | Superphosphate | 10600 lbs. | 117 |
| | | | | | Twine | 6 lbs. | 1 |
| | | | | | Equipment expense | | 25 |
| Silage | 336 | 364 | 1.25 bus. | Farm | Superphosphate | 1400 lbs. | 15 |
| | | | | | Filling costs | | 16 |
| | | | | | Building expense | | 14 |
| | | | | | Equipment expense | | 10 |
| Wheat | 300 | 440 | 25 bus. | Farm | Contract threshing | 280 bus. | 34 |
| | | | | | Twine | 40 lbs. | 6 |
| | | | | | Equipment expense | | 15 |
| Mixed clover hay[1] | 268 | 295 | 60 lbs. Red clover | $18 | Limestone | 40 T. | 130 |
| | | | 20 lbs. Alsike | 5 | Equipment expense | | 15 |
| | | | 60 lbs. Alfalfa | 14 | | | |
| | | | 100 lbs. Orchard grass | 18 | | | |
| Rye (pasture mixture)[2] | 30 | 15 | 15 bus. Rye | 21 | Equipment expense | | 3 |
| | | | 50 lbs. Japan clover | 5 | | | |
| | | | 50 lbs. Orchard grass | 9 | | | |
| | | | 30 lbs. Redtop | 6 | | | |
| | | | 40 lbs. Sweet clover | 7 | | | |
| Total | 4364 | 3394 | | $103 | Fertilizer and other materials | | $432 |
| | | | | | Building expense | | 64 |
| | | | | | Equipment expense | | 83 |

[1] Five acres harvested second year. Requirements for th is acreage for harvesting only. [2] Rye seeded in standing corn.

**TABLE 20. Budget for suggested system 10 (200-acre farm—3 men, 6 horses) (Continued)**
**Section C. Livestock: Number, and man labor, horse work, feed and material requirements**

| Livestock | Number | Man Hrs. | Horse Hrs. | Home Grown Feeds | | Purchased Feed and Other Expenses | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Kind | Amount | Kind | Amount | Value |
| Dairy cows | 16 | 2400 | 160 | Corn | 256 bus. | Cottonseed meal | 3200 lbs. | $70 |
| | | | | Legume hay | 28800 lbs. | Building expense | | 48 |
| | | | | Silage | 72000 lbs. | Equipment expense | | 24 |
| | | | | | | Miscellaneous | | 40 |
| Veals | 10 | 50 | 10 | Whole milk | 4800 lbs. | | | |
| Dairy calves | 4 | 40 | 4 | Corn | 4 bus. | Bran and shorts | 120 lbs. | 2 |
| | | | | Whole milk | 1920 lbs. | Linseed meal | 40 lbs. | 1 |
| | | | | Legume hay | 800 lbs. | Bldg. & miscl. expense | | 4 |
| Dairy heifers | 4 | 40 | 4 | Corn | 8 bus. | Bran and shorts | 400 lbs. | 7 |
| | | | | Legume hay | 3000 lbs. | Building expense | | 2 |
| | | | | Silage | 1500 lbs. | Miscellaneous | | 1 |
| Sheep | 60 | 360 | 90 | | | Oats | 45 bus. | 29 |
| | | | | Corn | 30 bus. | Bran and shorts | 1440 lbs. | 26 |
| | | | | Legume hay | 12000 lbs. | Linseed meal | 480 lbs. | 14 |
| | | | | Silage | 24000 lbs. | Building expense | | 18 |
| | | | | | | Miscellaneous | | 1 |
| Sows and pigs | 3 | 240 | 48 | | | Tankage | 960 lbs. | 37 |
| | | | | Corn | 336 bus. | Equipment expense | | 5 |
| | | | | | | Miscellaneous | | 7 |
| Poultry | 240 | 960 | 72 | | | Meat scrap | 1200 lbs. | 54 |
| | | | | | | Bran and shorts | 4800 lbs. | 86 |
| | | | | | | Baby chick feed | 480 lbs. | 24 |
| | | | | Corn | 283 bus. | Oyster shell | 960 lbs. | 10 |
| | | | | | | Building expense | | 48 |
| | | | | | | Miscellaneous | | 2 |
| Work stock | 6 | 270 | 30 | Corn | 240 bus. | Building expense | | 21 |
| | | | | Legume hay | 17900 lbs. | Equipment expense | | 12 |
| | | | | Corn stover | 6200 lbs. | Depreciation | | 42 |
| | | | | | | Miscellaneous | | 10 |
| Total | | 4360 | 418 | Corn | 1157 bus. | Feeds | | $360 |
| | | | | Whole milk | 6720 lbs. | Building expense | | 138 |
| | | | | Legume hay | 62500 lbs. | Equipment expense | | 41 |
| | | | | Silage | 97500 lbs. | Depreciation on work stock | | 42 |
| | | | | Corn stover | 6200 lbs. | Miscellaneous | | 62 |

TABLE 20. Budget for suggested system 10 (200-acre farm—3 men, 6 horses) (Continued)
Section D. Livestock: Production and disposition of products

| Kind of Livestock and Product | Production | Disposal | | | | |
|---|---|---|---|---|---|---|
| | | Fed to Livestock | Used in Home | | Sales | |
| | | | Amount | Value | Amount | Value |
| Dairy cows | | | (800 gal.) | | | |
| Whole milk | 90000 lbs. | 6720 lbs. | 6880 lbs. | $144 | 76400 lbs. | $1604 |
| Veals | 1400 lbs. | | | | 1400 lbs. | 112 |
| Cull cows | 4 cows | | | | 4 cows | 96 |
| Pork | 4800 lbs. | | 900 lbs. | 79 | 3900 lbs. | 341 |
| Sheep, Lambs | 4200 lbs. | | | | 4200 lbs. | 420 |
| Old sheep | 660 lbs. | | | | 660 lbs. | 20 |
| Wool | 420 lbs. | | | | 420 lbs. | 141 |
| Poultry, Eggs | 2160 doz. | 120 doz. set | 300 doz. | 75 | 1740 doz. | 435 |
| Fryers | 960 lbs. | | 225 lbs. | 58 | 735 lbs. | 191 |
| Hens | 960 lbs. | | | | 960 lbs. | 173 |
| Total | | | | $356 | | $3533 |

TABLE 20. Budget for suggested system 10 (200-acre farm—3 men, 6 horses) (Continued)
Section E. Summary of receipts and expenses

| Incomes | | Expenses | |
|---|---|---|---|
| Crops (Section A) | $1282 | Crops (Section B) | |
| Livestock and livestock products (Section D) | 3533 | Seeds and plants | $103 |
| Livestock products used in home (Section D) | 356 | Fertilizer and other materials | 432 |
| Garden and truck | 400 | Building expense | 64 |
| | | Equipment expense | 83 |
| Total | $5571 | | |
| | | Livestock (Section C) | |
| | | Feeds purchased | 360 |
| | | Building expense | 138 |
| | | Equipment expense | 41 |
| | | Depreciation on work stock | 42 |
| | | Miscellaneous | 62 |
| Net return $4046 | | | |
| | | General Farm | |
| | | Fence expense | 80 |
| | | Automobile expense | 120 |
| | | Total | $1525 |

**TABLE 21. Budget for suggested system 11 (200-acre farm—3 men, 6 horses)**
**Section A. Crops: Acreage, production and disposition**

| Crop | Acres | Production | Farm Use | | Sales | |
|---|---|---|---|---|---|---|
| | | | Feed | Seed | Amount | Value |
| Tobacco | 4 | 3800 lbs. | | | 3800 lbs. | $380 |
| Sweetpotatoes | 4 | 520 bus. | | 16 bus. | 504 bus. | 252 |
| Strawberries (harvested) | 8 | 560 crates | | | 560 crates | 1680 |
| Strawberries (young) | 4 | | | | | |
| Corn, grain | 35 | 1225 bus. | 1220.6 bus. | 4.4 bus. | | |
| Corn, stover | 25 | 57500 lbs. | 57500 lbs. | | | |
| Wheat | 25 | 350 bus. | | 31.25 bus. | 318.75 bus. | 414 |
| Mixed clover hay | 29 | 72500 lbs. | 72500 lbs. | | | |
| Clover and grass | 29 | Pasture | Pasture | | | |
| Pasture mixture | 30 | Pasture | Pasture | | | |
| Rye (mixed clover) | 4 | Pasture | Pasture | | | |
| Rye (cover crop) | 4 | | | | | |
| Orchard and truck | 5 | | | | | |
| Lots | 7 | | | | | |
| Woodland | 16 | | | | | |
| Total | | | | | | $2726 |

**TABLE 21. Budget for suggested system 11 (200-acre farm—3 men, 6 horses) (Continued)**
**Section B. Crops: Man Labor, horse work and other requirements**

| Crop | Man Hrs. | Horse Hrs. | Seeds and Plants | | | Fertilizer and Other Materials | | |
|---|---|---|---|---|---|---|---|---|
| | | | Amount | | Value | Kind | Amount | Value |
| Tobacco | 1000 | 360 | | | | Fertilizer (5-9-4) | 2000 lbs. | $40 |
| | | | | | | Canvas | 27 yds. | 1 |
| | | | | | | Arsenate of lead | 16 lbs. | 4 |
| | | | | | | Building expense | | 20 |
| | | | | | | Equipment expense | | 6 |
| Sweetpotatoes | 560 | 400 | 16 | bus. | 6 | Fertilizer (2-10-12) | 1000 lbs. | 18 |
| | | | | | Farm | Manure | 6 T. | Farm |
| | | | | | | Corrosive sublimate | 8 ozs. | 1 |
| | | | | | | Equipment expense | | 6 |
| Strawberries | 1080 | 540 | 18000 | plants | $63 | Superphosphate | 800 lbs. | 9 |
| | | | | | | Straw | 8 T. | Farm |
| | | | | | | Strawberry crates | 560 | 190 |
| | | | | | | Contract picking | 560 crates | 448 |
| | | | | | | Grading and crating | 560 crates | 112 |
| | | | | | | Building expense | | 4 |
| | | | | | | Equipment expense | | 12 |
| Corn | 1270 | 1420 | 4.4 | bus. | Farm | Superphosphate | 14000 lbs. | 154 |
| | | | | | | Twine | 50 lbs. | 8 |
| | | | | | | Equipment expense | | 26 |
| Wheat | 375 | 550 | 31.25 | bus. | Farm | Contract threshing | 350 bus. | 42 |
| | | | | | | Twine | 50 lbs. | 8 |
| | | | | | | Equipment expense | | 19 |
| Mixed clover hay | 319 | 348 | 87 | lbs. Red clover | $26 | Limestone | 58 T. | 188 |
| | | | 29 | lbs. Alsike | 7 | Equipment expense | | 17 |
| | | | 87 | lbs. Alfalfa | 20 | | | |
| | | | 145 | lbs. Orchard grass | 26 | | | |
| Pasture mixture | 40 | 100 | 50 | lbs. Japan clover | 5 | Equipment expense | | 2 |
| | | | 50 | lbs. Orchard grass | 9 | | | |
| | | | 30 | lbs. Redtop | 6 | | | |
| | | | 40 | lbs. Sweet clover | 7 | | | |
| Rye (seeding) | 32 | 80 | 12 | bus. | 17 | Equipment expense | | 1 |
| Total | 4676 | 3798 | | | $186 | Fertilizer and other materials | | $1223 |
| | | | | | | Building expense | | 24 |
| | | | | | | Equipment expense | | 89 |

**TABLE 21. Budget for suggested system 11 (200-acre farm—3 men, 6 horses) (Continued)**
**Section C. Livestock: Number, and man labor, horse work, feed and material requirements**

| Livestock | Number | Man Hrs. | Horse Hrs. | Home Grown Feeds | | Purchased Feed and Other Expenses | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Kind | Amount | Kind | Amount | Value |
| | | | | | | Bran and shorts | 2000 lbs. | $36 |
| | | | | Corn | 320 bus. | Cottonseed meal | 6000 lbs. | 132 |
| Dairy cows | 20 | 3000 | 200 | Legume hay | 50000 lbs. | Building expense | | 60 |
| | | | | Corn stover | 20000 lbs. | Equipment expense | | 30 |
| | | | | | | Miscellaneous | | 50 |
| Veals | 14 | 70 | 14 | Whole milk | 6720 lbs. | | | |
| | | | | Corn | 5 bus. | Bran and shorts | 150 lbs. | 3 |
| Dairy calves | 5 | 50 | 5 | Whole milk | 2400 lbs. | Linseed meal | 50 lbs. | 2 |
| | | | | Legume hay | 1000 lbs. | Bldg. & miscl. expense | | 2 |
| | | | | Corn | 10 bus. | Bran and shorts | 500 lbs. | 9 |
| Dairy heifers | 5 | 50 | 5 | Legume hay | 5000 lbs. | Building expense | | 2 |
| | | | | | | Miscellaneous | | 1 |
| | | | | | | Tankage | 960 lbs. | 37 |
| Sows and pigs | 3 | 240 | 48 | Corn | 336 bus. | Equipment expense | | 3 |
| | | | | | | Miscellaneous | | 4 |
| | | | | | | Bran and shorts | 5200 lbs. | 94 |
| | | | | | | Meat scrap | 1300 lbs. | 58 |
| Poultry | 260 | 1040 | 78 | Corn | 306 bus. | Baby chick feed | 520 lbs. | 26 |
| | | | | | | Oyster shell | 1040 lbs. | 10 |
| | | | | | | Building expense | | 52 |
| | | | | | | Miscellaneous | | 3 |
| | | | | | | Building expense | | 21 |
| | | | | Corn | 240 bus. | Equipment expense | | 12 |
| Work stock | 6 | 270 | 30 | Legume hay | 16500 lbs. | Depreciation | | 42 |
| | | | | Corn stover | 3000 lbs. | Miscellaneous | | 10 |
| | | | | Corn | 1217 bus. | Feeds | | $407 |
| Total | | 4720 | 380 | Whole milk | 9120 lbs. | Building expense | | 136 |
| | | | | Legume hay | 72500 lbs. | Equipment expense | | 45 |
| | | | | Corn stover | 23000 lbs. | Depreciation on work stock | | 42 |
| | | | | | | Miscellaneous | | 69 |

TABLE 21. Budget for suggested system 11 (200-acre farm—3 men, 6 horses) (Continued)
Section D. Livestock: Production and disposition of products

| Kind of Livestock and Product | Production | Disposal | | | | |
|---|---|---|---|---|---|---|
| | | Fed to Livestock | Used in Home | | Sales | |
| | | | Amount | Value | Amount | Value |
| Dairy cows | | | (800 gal.) | | | |
| Whole milk | 100000 lbs. | 9120 lbs. | 6880 lbs. | $144 | 84000 lbs. | $1764 |
| Veals | 1960 lbs. | | | | 1960 lbs. | 157 |
| Cull cows | 5 cows | | | | 5 cows | 120 |
| Pork | 4800 lbs. | | 900 lbs. | 79 | 3900 lbs. | 341 |
| Poultry, Eggs | 2340 doz. | 130 doz. set | 300 doz. | 75 | 1910 doz. | 478 |
| Fryers | 1040 lbs. | | 225 lbs. | 58 | 815 lbs. | 212 |
| Hens | 1040 lbs. | | | | 1040 lbs. | 187 |
| Total | | | | $356 | | $3259 |

TABLE 21. Budget for suggested system 11 (200-acre farm—3 men, 6 horses) (Continued)
Section E. Summary of receipts and expenses

| Incomes | | | Expenses | |
|---|---|---|---|---|
| Crops (Section A) | | $2726 | Crops (Section B) | |
| Livestock and livestock products (Section D) | | 3259 | Seeds and plants | $186 |
| Livestock products used in home (Section D) | | 356 | Fertilizer and other materials | 1223 |
| Garden and truck | | 400 | Building expense | 24 |
| | | | Equipment expense | 89 |
| Total | | $6741 | | |
| | | | Livestock (Section C) | |
| | | | Feeds purchased | 407 |
| | | | Building expense | 136 |
| | | | Equipment expense | 45 |
| | | | Depreciation on work stock | 42 |
| | | | Miscellaneous | 69 |
| Net return | $4320 | | General Farm | |
| | | | Fence expense | 80 |
| | | | Automobile expense | 120 |
| | | | Total | $2421 |

**TABLE 22. Budget for suggested system 12 (300-acre farm—3 men, 7 horses)**
**Section A. Crops: Acreage, production and disposition**

| Crop | Acres | Production | Farm Use | | Sales | |
|---|---|---|---|---|---|---|
| | | | Feed | Seed | Amount | Value |
| Tobacco | 7 | 6650 lbs. | | | 6650 lbs. | $665 |
| Corn, grain | 45 | 1575 bus. | 1569.4 bus. | 5.6 bus. | | |
| Corn, stover | 19 | 43700 lbs. | 43700 lbs. | | | |
| Wheat | 26 | 364 bus. | | 32.5 bus. | 331.5 bus. | 431 |
| Mixed clover hay | 52 | 130000 lbs. | 130000 lbs. | | | |
| Clover and grass | 104 | Pasture | Pasture | | | |
| Rye (mixed clover) | 26 | Pasture | Pasture | | | |
| Orchard and truck | 6 | | | | | |
| Lots | 10 | | | | | |
| Woodland | 24 | | | | | |
| Total | | | | | | $1096 |

**TABLE 22. Budget for suggested system 12 (300-acre farm—3 men, 7 horses) (Continued)**
**Section B. Crops: Man Labor, horse work and other requirements**

| Crop | Man Hrs. | Horse Hrs. | Seeds and Plants | | Fertilizer and Other Materials | | |
|---|---|---|---|---|---|---|---|
| | | | Amount | Value | Kind | Amount | Value |
| Tobacco | 1750 | 630 | | | Fertilizer (5-9-4) | 3500 lbs. | $70 |
| | | | | | Canvas | 47 yds. | 2 |
| | | | | | Arsenate of lead | 28 lbs. | 7 |
| | | | | | Building expense | | 35 |
| | | | | | Equipment expense | | 10 |
| Corn | 1462 | 1852 | 5.6 bus. | Farm | Superphosphate | 18000 lbs. | 198 |
| | | | | | Twine | 38 lbs. | 6 |
| | | | | | Equipment expense | | 34 |
| Wheat | 390 | 572 | 32.5 bus. | Farm | Contract threshing | 364 bus. | 44 |
| | | | | | Twine | 52 lbs. | 8 |
| | | | | | Equipment expense | | 20 |
| Mixed clover hay | 572 | 624 | 156 lbs. Red clover | $47 | Limestone | 104 T. | 338 |
| | | | 52 lbs. Alsike | 13 | Equipment expense | | 31 |
| | | | 156 lbs. Alfalfa | 36 | | | |
| | | | 260 lbs. Orchard grass | 29 | | | |
| Rye (seeding)[1] | 52 | 39 | 39 bus. | 55 | Equipment expense | | 8 |
| Total | 4226 | 3717 | | $198 | Fertilizer and other materials | | $673 |
| | | | | | Building expense | | 35 |
| | | | | | Equipment expense | | 103 |

[1] Seeded in standing corn.

**TABLE 22. Budget for suggested system 12 (300-acre farm—3 men, 7 horses) (Continued)**
**Section C. Livestock: Number, and man labor, horse work, feed and material requirements**

| Livestock | Number | Man Hrs. | Horse Hrs. | Home Grown Feeds | | Purchased Feed and Other Expenses | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Kind | Amount | Kind | Amount | Value |
| Dairy cows | 25 | 3750 | 250 | Corn<br>Legume hay<br>Corn stover | 400 bus.<br>62500 lbs.<br>25000 lbs. | Bran and shorts<br>Cottonseed meal<br>Building expense<br>Equipment expense<br>Miscellaneous | 2500 lbs.<br>7500 lbs. | $45<br>165<br>75<br>38<br>62 |
| Veals | 17 | 85 | 17 | Whole milk | 8160 lbs. | | | |
| Dairy calves | 6 | 60 | 6 | Corn<br>Whole milk<br>Legume hay | 6 bus.<br>2880 lbs.<br>1200 lbs. | Bran and shorts<br>Linseed meal<br>Building expense<br>Miscellaneous | 180 lbs.<br>60 lbs. | 3<br>2<br>2<br>1 |
| Dairy heifers | 6 | 60 | 6 | Corn<br>Legume hay | 12 bus.<br>6000 lbs. | Bran and shorts<br>Building expense<br>Miscellaneous | 600 lbs. | 11<br>3<br>1 |
| Sheep | 120 | 720 | 180 | Corn<br>Legume hay | 180 bus.<br>39000 lbs. | Linseed meal<br>Building expense<br>Miscellaneous | 300 lbs. | 9<br>36<br>2 |
| Sows and pigs | 3 | 240 | 48 | Corn | 336 bus. | Tankage<br>Equipment expense<br>Miscellaneous | 960 lbs. | 37<br>5<br>7 |
| Poultry | 300 | 1200 | 90 | Corn | 354 bus. | Bran and shorts<br>Meat scrap<br>Baby chick feed<br>Oyster shell<br>Building expense<br>Miscellaneous | 6000 lbs.<br>1500 lbs.<br>600 lbs.<br>1200 lbs. | 108<br>68<br>30<br>12<br>60<br>3 |
| Work stock | 7 | 315 | 35 | Corn<br>Legume hay<br>Corn stover | 280 bus.<br>21000 lbs.<br>7000 lbs. | Building expense<br>Equipment expense<br>Depreciation<br>Miscellaneous | | 24<br>14<br>49<br>12 |
| Total | | 6310 | 602 | Corn<br>Whole milk<br>Legume hay<br>Corn stover | 1538 bus.<br>11040 lbs.<br>129700 lbs.<br>32000 lbs. | Feeds<br>Building expense<br>Equipment expense<br>Depreciation on work stock<br>Miscellaneous | | $490<br>200<br>57<br>49<br>38 |

**TABLE 22. Budget for suggested system 12 (300-acre farm—3 men, 7 horses) (Continued)**
**Section D. Livestock: Production and disposition of products**

| Kind of Livestock and Product | Production | Disposal | | | | |
|---|---|---|---|---|---|---|
| | | Fed to Livestock | Used in Home | | Sales | |
| | | | Amount | Value | Amount | Value |
| Dairy cows | | | (900 gal.) | | | |
| Whole milk | 125000 lbs. | 11040 lbs. | 7740 lbs. | $163 | 106220 lbs. | $2231 |
| Veals | 2380 lbs. | | | | 2380 lbs. | 190 |
| Cull cows | 6 cows | | | | 6 cows | 144 |
| Sheep, Lambs | 8400 lbs. | | | | 8400 lbs. | 840 |
| Old sheep | 1320 lbs. | | | | 1320 lbs. | 40 |
| Wool | 840 lbs. | | | | 840 lbs. | 302 |
| Pork | 4800 lbs. | | 1000 lbs. | 88 | 3800 lbs. | 332 |
| Poultry, Eggs | 2700 doz. | 150 doz. set | 350 doz. | 88 | 2200 doz. | 550 |
| Fryers | 1200 lbs. | | 250 lbs. | 65 | 950 lbs. | 247 |
| Hens | 1200 lbs. | | | | 1200 lbs. | 216 |
| Total | | | | $404 | | $5092 |

TABLE 22. Budget for suggested system 12 (300-acre farm—3 men, 7 horses) (Continued)
Section E. Summary of receipts and expenses

| Incomes | | Expenses | |
|---|---|---|---|
| Crops (Section A) | $1096 | Crops (Section B) | |
| Livestock and livestock products (Section D) | 5092 | Seeds and plants | $198 |
| Livestock products used in home (Section D) | 404 | Fertilizer and other materials | 673 |
| Garden and truck | 450 | Building expense | 35 |
| | | Equipment expense | 103 |
| Total | $7042 | | |
| | | Livestock (Section C) | |
| | | Feeds purchased | 490 |
| | | Building expense | 200 |
| | | Equipment expense | 57 |
| | | Depreciation on work stock | 49 |
| | | Miscellaneous | 88 |
| Net return $4924 | | | |
| | | General Farm | |
| | | Fence expense | 90 |
| | | Automobile expense | 135 |
| | | Total | $2118 |

**TABLE 23. Budget for suggested system 13 (300-acre farm—3 men, 7 horses)**
**Section A. Crops: Acreage, production and disposition**

| Crop | Acres | Production | Farm Use | | Sales | |
|---|---|---|---|---|---|---|
| | | | Feed | Seed | Amount | Value |
| Tobacco | 4 | 3800 lbs. | | | 3800 lbs. | $380 |
| Tomatoes | 4 | 520 bus. | | | 520 bus. | 208 |
| Strawberries (harvested) | 8 | 560 crates | | | 560 crates | 1680 |
| Strawberries (young) | 4 | | | | | |
| Corn, grain | 40 | 1400 bus. | 1393.6 bus. | 6.4 bus. | | |
| Corn, stover | 24 | 55200 lbs. | 55200 lbs. | | | |
| Corn, silage | 8 | 56 T. | 56 T. | | | |
| Wheat | 32 | 448 bus. | | 40 bus. | 408 bus. | 530 |
| Mixed clover hay | 38 | 95000 lbs. | 95000 lbs. | | | |
| Clover and grass | 106 | Pasture | Pasture | | | |
| Rye (pasture mixture) | 16 | Pasture | Pasture | | | |
| Rye (cover crop) | 4 | | | | | |
| Orchard and truck | 6 | | | | | |
| Lots | 16 | | | | | |
| Woodland | 24 | | | | | |
| Total | | | | | | $2798 |

**TABLE 23. Budget for suggested system 13 (300-acre farm—3 men, 7 horses) (Continued)**
**Section B. Crops: Man Labor, horse work and other requirements**

| Crop | Man Hrs. | Horse Hrs. | Seeds and Plants | | Fertilizer and Other Materials | | |
|---|---|---|---|---|---|---|---|
| | | | Amount | Value | Kind | Amount | Value |
| Tobacco | 1000 | 360 | | | Fertilizer (5-9-4) | 1400 lbs. | $28 |
| | | | | | Canvas | 27 yds. | 1 |
| | | | | | Arsenate of lead | 16 lbs. | 4 |
| | | | | | Building expense | | 20 |
| | | | | | Equipment expense | | 6 |
| Tomatoes | 640 | 480 | 8 oz. | $2 | Superphosphate | 2000 lbs. | 22 |
| | | | | | Canvas | 24 yds. | 1 |
| | | | | | Equipment expense | | 6 |

**TABLE 23. Budget for suggested system 13 (300-acre farm—3 men, 7 horses) (Continued)**
**Section B. Crops: Man labor, horse work and other requirements (Continued)**

| Crop | Man Hrs. | Horse Hrs. | Seeds and Plants | | | Fertilizer and Other Materials | | |
|---|---|---|---|---|---|---|---|---|
| | | | Amount | | Value | Kind | Amount | Value |
| Strawberries | 1080 | 540 | 18000 | plants | 63 | Superphosphate | 800 lbs. | 9 |
| | | | | | | Straw | 8 T. | Farm |
| | | | | | | Strawberry crates | 560 | 190 |
| | | | | | | Contract picking | 560 crates | 448 |
| | | | | | | Grading and crating | 560 crates | 112 |
| | | | | | | Building expense | | 4 |
| | | | | | | Equipment expense | | 12 |
| Corn | 1392 | 1632 | 5 | bus. | Farm | Superphosphate | 16000 lbs. | 176 |
| | | | | | | Twine | 48 lbs. | 8 |
| | | | | | | Equipment expense | | 30 |
| Silage | 384 | 416 | 1.4 | bus. | Farm | Superphosphate | 3200 lbs. | 35 |
| | | | | | | Filling costs | | 18 |
| | | | | | | Building expense | | 16 |
| | | | | | | Equipment expense | | 11 |
| Wheat | 480 | 704 | 40 | bus. | Farm | Contract threshing | 448 bus. | 54 |
| | | | | | | Twine | 64 lbs. | 10 |
| | | | | | | Equipment expense | | 24 |
| Mixed clover hay[1] | 410 | 450 | 96 | lbs. Red clover | $29 | | | |
| | | | 32 | lbs. Alsike | 8 | | | |
| | | | 96 | lbs. Alfalfa | 22 | Limestone | 64 T. | 208 |
| | | | 160 | lbs. Orchard grass | 29 | Equipment expense | | 23 |
| Rye (Seeding)[2] | 48 | 64 | 30 | bus. Rye | 42 | | | |
| Pasture mixture (seeded in rye) | 16 | | 80 | lbs. Japan clover | 15 | | | |
| | | | 80 | lbs. Orchard grass | 14 | | | |
| | | | 48 | lbs. Redtop | 9 | | | |
| | | | 16 | lbs. Sweet clover | 12 | | | |
| Total | 5482 | 4772 | | | $245 | Fertilizer and other materials | | $1324 |
| | | | | | | Building expense | | 40 |
| | | | | | | Equipment expense | | 112 |

[1] Six acres harvested second year. Requirements for this acreage for harvesting only. [2] Four acres cover crop and 16 acres for nurse crop and pasture, the latter seeded in standing corn.

**TABLE 23. Budget for suggested system 13 (300-acre farm—3 men, 7 horses) (Continued)**
**Section C. Livestock: Number, and man labor, horse work, feed and material requirements**

| Livestock | Number | Man Hrs. | Horse Hrs. | Home Grown Feeds | | Purchased Feed and Other Expenses | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Kind | Amount | Kind | Amount | Value |
| Dairy cows | 22 | 3300 | 220 | Corn<br>Legume hay<br>Silage | 352 bus.<br>39600 lbs.<br>99000 lbs. | Cottonseed meal<br>Building expense<br>Equipment expense<br>Miscellaneous | 4400 lbs. | $97<br>66<br>33<br>55 |
| Veals | 15 | 75 | 15 | Whole milk | 7200 lbs. | | | |
| Dairy calves | 5 | 50 | 5 | Corn<br>Whole milk<br>Legume hay | 5 bus.<br>2400 lbs.<br>1000 lbs. | Bran and shorts<br>Linseed meal<br>Bldg. & miscl. expense | 150 lbs.<br>50 lbs. | 3<br>2<br>2 |
| Dairy heifers | 5 | 50 | 5 | Corn<br>Legume hay<br>Silage<br>Corn stover | 10 bus.<br>1900 lbs.<br>7500 lbs.<br>1200 lbs. | Bran and shorts<br>Building expense<br>Miscellaneous | 500 lbs. | 9<br>2<br>1 |
| Sheep | 100 | 600 | 150 | Corn<br>Legume hay | 112 bus.<br>32500 lbs. | Oats<br>Building expense<br>Miscellaneous | 75 bus. | 49<br>30<br>2 |
| Sows and pigs | 3 | 240 | 48 | Corn | 336 bus. | Tankage<br>Equipment expense<br>Miscellaneous | 960 lbs. | 37<br>5<br>7 |
| Poultry | 250 | 1000 | 75 | Corn | 295 bus. | Bran and shorts<br>Meat scrap<br>Baby chick feed<br>Oyster shell<br>Building expense<br>Miscellaneous | 5000 lbs.<br>1250 lbs.<br>500 lbs.<br>1000 lbs. | 90<br>56<br>25<br>10<br>50<br>2 |
| Work stock | 7 | 315 | 35 | Corn<br>Legume hay<br>Corn stover | 280 bus.<br>20000 lbs.<br>10000 lbs. | Building expense<br>Equipment expense<br>Depreciation<br>Miscellaneous | | 24<br>52<br>49<br>80 |
| Total | | 5630 | 553 | Corn<br>Whole milk<br>Legume hay<br>Silage<br>Corn stover | 1390 bus.<br>9600 lbs.<br>95000 lbs.<br>106500 lbs.<br>11200 lbs. | Feeds<br>Building expense<br>Equipment expense<br>Depreciation on work stock<br>Miscellaneous | | $378<br>173<br>52<br>49<br>80 |

TABLE 23. Budget for suggested system 13 (300-acre farm—3 men, 7 horses) (Continued)
Section D. Livestock: Production and disposition of products

| Kind of Livestock and Product | Production | Disposal | | | | |
|---|---|---|---|---|---|---|
| | | Fed to Livestock | Used in Home | | Sales | |
| | | | Amount | Value | Amount | Value |
| Dairy cows | | | (900 gal.) | | | |
| Whole milk | 110000 lbs. | 960 lbs. | 7740 lbs. | $163 | 92660 lbs. | $1946 |
| Veals | 2100 lbs. | | | | 2100 lbs. | 168 |
| Cull cows | 5 cows | | | | 5 cows | 120 |
| Sheep, Lambs | 7000 lbs. | | | | 7000 lbs. | 700 |
| Old sheep | 1100 lbs. | | | | 1100 lbs. | 33 |
| Wool | 700 lbs. | | | | 700 lbs. | 252 |
| Pork | 4800 lbs. | | 1000 lbs. | 88 | 3800 lbs. | 332 |
| Poultry, Eggs | 2250 doz. | 125 doz. set | 350 doz. | 88 | 1775 doz. | 444 |
| Fryers | 1000 lbs. | | 250 lbs. | 65 | 750 lbs. | 195 |
| Hens | 1000 lbs. | | | | 1000 lbs. | 180 |
| Total | | | | $404 | | $4370 |

TABLE 23. Budget for suggested system 13 (300-acre farm--3 men, 7 horses) (Continued)
Section E. Summary of receipts and expenses

| Incomes | | Expenses | |
|---|---|---|---|
| Crops | $2798 | Crops (Section B) | |
| Livestock and livestock products (Section D) | 4370 | Seeds and plants | $245 |
| Livestock products used in home (Section D) | 404 | Fertilizer and other materials | 1324 |
| Garden and truck | 450 | Building expense | 40 |
| | | Equipment expense | 112 |
| Total | $8022 | | |
| | | Livestock (Section C) | |
| | | Feeds purchased | 378 |
| | | Building expense | 173 |
| | | Equipment expense | 52 |
| | | Depreciation on work stock | 49 |
| | | Miscellaneous | 80 |
| Net return $5144 | | | |
| | | General Farm | |
| | | Fence expense | 90 |
| | | Automobile expense | 135 |
| | | Labor | 200 |
| | | Total | $2878 |

## BIBLIOGRAPHY


I Economic theory and research methods:

Bennett, Merrill K., "Farm Cost Studies in the United States," 1928.

Black, John D., "Production Economics," 1926.

———, and others, "Research Method and Procedure in Agricultural Economics," 1928.

Clark, J. Maurice, "The Economics of Overhead Costs," 1923.

Cooper, Thomas, "Coordination of Economic Research," Journal of Farm Economics, January, 1926.

Davenport, H. J., "Economics of Enterprise," 1913.

Elliott, F. F., "The 'Representative Firm' Idea Applied to Research in Agricultural Economics," Journal of Farm Economics, October, 1928.

King, J. S., "Cost Accounting Applied to Agriculture," 1928.

Holmes, C. L., "Economics of Farm Organization and Management," 1928.

Marshall, Alfred, "Principles of Economics," 8th Ed., 1920.

Mitchell, Wesley, C., "Business Cycles: the problem and its setting," 1927.

———, "Quantitative Analysis in Economic Theory," American Economic Review, March, 1928.

Pond, George A. and Tapp, Jesse W., United States Department of Agriculture Bulletin 1271, "A Study of Farm Organization in Southwestern Minnesota," 1924.

Roth, W. J., "Farm Budgeting in Germany," Journal of Farm Economics, October, 1929.

Seligman, Edwin R. A., "Economics of Farm Relief," 1929.

Spillman, W. J., United States Department of Agriculture Farmers' Bulletin 1289, "Distribution of Types of Farming in the United States," 1923.

Tapp, Jesse W., "Research Problems Involved in Providing Continuous Economic Information to Farmers," Journal of Farm Economics, January, 1929.

Taylor, Henry C., "Agricultural Economics," 1919.

Tolley, H. R., Black, John D., and Ezekiel, Mordecai, United States Department of Agriculture Bulletin 1277, "Input as Related to Output in Farm Organization and Cost-of-Production Studies," 1924.

Tugwell, R. G., edited by; "The Trend of Economics," 1924. Warren, G. F., and Pearson, F. A., "The Agricultural Situation," 1924.

Wilson, M. L., and others, "Experimental Method in Economic Research," Journal of Farm Economics, October, 1929.

II Sources of information used in making the study in the Purchase Region of Kentucky:

Averitt, S. D., and Jones, S. C., Kentucky Experiment Station Bulletin 277, "Soils in the Purchase Region of Kentucky," 1927.

Brodell, A. P., and Washburn, R. S., United States Department of Agriculture Mimeographed Report, "The Commercial Fresh Peach Industry in the United States," 1926.

Cooper, M. R., and Park, J. W., United States Department of Agriculture Circular 420, 1927, "The Peach Situation in the Southern States," 1927.

Henry, Wm. A., and Morrison, F. B., "Feeds and Feeding," 1922.

Hutson, J. B., Kentucky Experiment Station Bulletin 255, "Strawberries and Farm Profits in Western Kentucky," 1924.

———, and Finn, W. G., Kentucky Experiment Station Bulletin 274, "Man Labor, Horse Work, and Materials Used in Producing Crops in Christian County," 1926.

———, ———, and Galloway, Z. L., Kentucky Experiment Station Bulletin 289, "An Economic Study of Crops and Livestock in the Purchase Region of Kentucky," 1928.

Roberts, Geo., Kinney, E. J., and Freeman, J. F., Kentucky Experiment Station Bulletin 272, "Field Experiments on Soils and Crops," 1926.

United States Department of Agriculture Annual Outlook Reports.

United States Department of Agriculture Annual Yearbooks.

United States Department of Commerce Agricultural Census Report, 1925.

## VITA

John B. Hutson, the author of this dissertation, was born on a farm in Calloway County, Kentucky, September 7, 1890, and received his early education in the public schools of that county. He taught in the public schools of Calloway County, studied in the Western Kentucky State Normal School, Bowling Green, Kentucky, and in 1915 was graduated from that institution, receiving a teacher's life certificate. He entered the University of Kentucky in 1915 and received his B. S. degree in Agriculture in 1917. He was employed on research projects in farm management by the Kentucky Agricultural Experiment Station and the United States Department of Agriculture from June, 1917 to June, 1922, except for a short period when he served in the United States Army. During the school years 1922–23 and 1923–24 he was assistant professor in agricultural economics in the University of Kentucky and did part-time graduate work. He studied in the University of Wisconsin during the summer sessions of 1922, 1923 and 1925 and received his M. S. degree in agricultural economics from that institution in 1925. He has been employed by the Bureau of Agricultural Economics, United States Department of Agriculture, since June, 1924, except when he was on leave doing graduate work, and from June, 1924 to September, 1928, was in charge of the research projects in farm accounting undertaken by the Division of Farm Management in cooperation with the State colleges of agriculture. Since May, 1929, he has been in charge of the research projects on tobacco prices, giving particular attention to the factors affecting the acreage and prices of the various types of tobacco. He studied statistics under Mr. H. R. Tolley in the Department of Agriculture.

During the summer session of 1927 and the school year 1928–29 he studied economics and related subjects in Columbia University, receiving a Social Science Research Council fellowship for the latter period. Among those under whom he studied at Columbia University are Professors E. R. A. Seligman, Wesley C. Mitchell, Vladimir Simkovitch, H. Parker Willis, and H. J. Davenport.

Other publications of the writer include:

Kentucky Experiment Station Circular 21, "Livestock and Other Factors for Profitable Farming in Northern Kentucky," 1918.

Kentucky Experiment Station Bulletin 255, "Strawberries and Farm Profits in Western Kentucky," 1924.

United States Department of Agriculture Farmers' Bulletin 1564, "Farm Budgeting," 1928.

Publications in which the writer is joint author include:

Kentucky Experiment Station Bulletin 217, "Profitable Dairy Farm Organization in Kentucky," 1918.

Kentucky Experiment Station Bulletin 259, "Farming with Bluegrass," 1925.

Kentucky Experiment Station Bulletin 274, "Amounts of Man Labor, Horse Work, and Materials used in Growing Crops in Western Kentucky," 1926.

North Carolina Experiment Station Research Bulletin 1, "Profitable Farm Organizations for the Coastal Plain of North Carolina," 1926.

Colorado Experiment Station Bulletin 318, "Factors that Influence Profits on Irrigated Farms," 1927.

Virginia Experiment Station Bulletin 258, "Systems of Beef Cattle Farming for Southwestern Virginia," 1927.

South Dakota Experiment Station Bulletin 226, "Profitable Farming Systems for East Central Dakota," 1927.

Kentucky Experiment Station Bulletin 289, "An Economic Study of Crops and Livestock in the Purchase Region of Kentucky," 1928.

Texas Experiment Station Bulletin 395, "Systems of Farming for the Black Waxy Prairie Belt of Texas," 1929.

In addition he has prepared in the Department of Agriculture, numerous reports, some on methods in farm organization studies and some relating to supply and demand conditions for agricultural commodities which have been released as Division or Bureau publications.